United States Department of the Interior

NATIONAL PARK SERVICE
Yosemite National Park
P.O. Box 577
Yosemite National Park, California 95389

IN REPLY REFER TO:
A3823(YOSE)

April 25, 2003

Dear Yosemite Friends:

On behalf of the National Park Service, I am pleased to present the *South Fork Merced River Bridge Replacement Environmental Assessment*. The South Fork Bridge is located in Yosemite National Park on the South Fork Merced Wild and Scenic River in Wawona and conveys foot and vehicle traffic across the river via Wawona Road (Highway 41). The National Park Service proposes to remove the existing South Fork Bridge, replace it with a single- span structure, and remove the temporary Bailey bridge that has been carrying traffic since 1998. The South Fork Bridge, constructed in 1931, is no longer structurally sound or safe for use and has been condemned. The demolition and replacement of the bridge would increase visitor safety; protect the river and park utility lines attached to the bridge from impacts associated with the potential collapse of the condemned bridge; and remove the current in- channel bridge piers, which act as impediments to the free flow of the South Fork.

Public and agency participation has been a key element throughout this process. In September 2002, Yosemite National Park initiated the public scoping process to solicit ideas and concerns from affected federal agencies, state and local governments, American Indian groups, and interested organizations and individuals. The planning team reviewed public comments and has incorporated appropriate responses in this *South Fork Merced River Bridge Replacement Environmental Assessment*.

There will be a 30- day comment period on the environmental assessment. If the environmental assessment and a Finding of No Significant Impact are approved, new bridge construction is expected to occur during the 2003–2004 construction season, during low- flow periods of the river.

We appreciate your interest in this planning effort and welcome your participation. Comments must be submitted in writing by May 29, 2003 and may be sent to:

Mail:	Superintendent, Yosemite National Park ATTN: South Fork Merced River Bridge Replacement Project PO Box 577 Yosemite, CA 95389
Fax:	209/379- 1294
E- mail:	YOSE_planning@nps.gov

Written comments will also be accepted at the National Park Service planning open house held on May 21, 2003 (2:00 P.M. to 6:00 P.M.) at the Yosemite Valley Visitor Center East Auditorium. Planning teams will be on hand to answer questions and provide more information regarding the South Fork Merced River Bridge Replacement Project, as well as several other Yosemite National Park planning efforts. This document can be reviewed online at *www.nps.gov/yose/planning*. To request a printed copy, refer to the information directly above or call 209/379- 1365.

Sincerely,

Michael J. Tollefson
Superintendent

Yosemite National Park

Lead Agency: National Park Service

ABSTRACT

This *South Fork Merced River Bridge Replacement Environmental Assessment* is intended to guide the removal and replacement of the South Fork Bridge. The project and its environmental assessment, which evaluates the potential impacts of the project, are integrated in this document and are referred to collectively as the South Fork Merced River Bridge Replacement Project. The *South Fork Merced River Bridge Replacement Environmental Assessment* identifies and analyzes two alternatives: Alternative 1 – the No Action Alternative; and Alternative 2 – replace South Fork Bridge (the Preferred Alternative).

Alternative 1, the No Action Alternative, represents conditions and management practices as they currently exist at the South Fork Bridge. It provides the basis for comparison of Alternative 2. Alternative 2 is based on the Purpose Of and Need For the Project and conforms to the goals of Yosemite National Park's *General Management Plan* and goals and management elements of the *Merced Wild and Scenic River Comprehensive Management Plan*. Alternative 2 provides for the complete removal of the existing South Fork Bridge and replacement with a single- span bridge. The temporary Bailey bridge and road access (placed in 1998 to carry Wawona Road traffic after condemnation of the South Fork Bridge) would be removed upon completion of the bridge replacement project.

Written comments regarding this document should be directed to:

Mail: Superintendent, Yosemite National Park
ATTN: South Fork Merced River Bridge Replacement Project
PO Box 577
Yosemite, CA 95389

Fax: 209/379- 1294
Email: YOSE_planning@nps.gov

Written comments will also be accepted at the National Park Service planning open houses held on April 23, 2003 and May 26, 2003 (2:00 P.M. to 6:00 P.M.) at the Yosemite Valley Visitor Center East Auditorium. Planning teams will be on hand to answer questions and provide more information regarding the South Fork Merced River Bridge Replacement Project, as well as several other Yosemite National Park planning efforts.

The document can be reviewed online at www.nps.gov/yose/planning. To request a printed copy, refer to the information directly above or phone 209/379- 1365.

If individuals submitting comments request that their name and/or address be withheld from public disclosure, it will be honored to the extent allowable by law. Such requests must be stated prominently in the beginning of the comments. There also may be circumstances wherein the National Park Service will withhold a respondent's identity as allowable by law. As always, the National Park Service will make available to public inspection all submissions from organizations or businesses and from persons identifying themselves as representatives or officials of organizations and businesses; and anonymous comments may not be considered.

Yosemite National Park

National Park Service
U.S. Department of the Interior

South Fork Merced River Bridge Replacement Project

Environmental Assessment
April 2003

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Executive Summary

Introduction

The National Park Service in Yosemite National Park proposes to replace the South Fork Merced River Bridge (South Fork Bridge) in Wawona by the end of 2004. The bridge is located north of the historic Wawona Hotel, just inside the park's South Entrance. In order to cross the South Fork of the Merced Wild and Scenic River, all vehicle traffic along Wawona Road (Highway 41) must use this bridge, which conveys nearly one- third of Yosemite's annual visitors.

The South Fork Bridge was constructed in 1931 as a triple- span, steel- girder, deck bridge supported by spread concrete footings, two unreinforced cement rubble in- stream piers, and two unreinforced cement rubble abutments. The bridge is 134- feet long, 29- feet wide, and provides two 10- foot- wide travel lanes; however, there are no sidewalks or bridal paths on this structure. Like several other bridges of this era, the South Fork Bridge was characterized by massive log stringer façades and wooden guardrails, giving the appearance of being a rustic log structure. The bridge has been evaluated for inclusion on the National Register of Historic Places. However, it was determined ineligible due to reconstruction that had compromised the structural and architectural integrity.

In 1992, a structural bridge inspection identified deflection (bending) in the steel girders, requiring the park to impose weight restrictions on load limits to 7 tons. Although considered critically deficient, the bridge was allowed to remain in service. During a 1993 hydraulic review, a scour hole created by the river was discovered under one pier, resulting in a recommendation for complete bridge reconstruction. The structural integrity and safety of the bridge was further degraded by the January 1997 flood, which increased scouring around the piers and abutments. As a result, the South Fork Bridge was condemned, closed, and in 1998, its function was transferred to an adjacent temporary bridge.

Following the 1992 inspection by the Federal Highway Administration, it was determined that the South Fork Bridge would be replaced. An environmental assessment was released in 1996, detailing the removal and replacement of the South Fork Bridge, a Finding of No Significant Impact was signed, and the design phase for the project was implemented. However, a 1999 lawsuit on the El Portal Road Improvement Project resulted in halting plans to remove and replace the South Fork Bridge until completion of an approved comprehensive management plan for the Merced Wild and Scenic River. A Record of Decision for the *Merced Wild and Scenic River Comprehensive Management Plan* was signed in August 2000, and was revised in November 2000. This environmental assessment supercedes the 1996 Environmental Assessment, Replace South Fork Merced River Bridge Project, and the corresponding Finding of No Significant Impact is rescinded.

Purpose and Need

The purpose of the South Fork Merced River Bridge Replacement Project is to:

- Protect visitor health and safety by eliminating and replacing the condemned and closed bridge with a wider, safer structure; by opening the permanent roadway; and by removing the concrete barriers.

- Remove the temporary bridge, which has served beyond its original intent and has created a visual intrusion on an otherwise popular scenic location.
- Protect the park infrastructure from bridge collapse, specifically the reclaimed waterline and sewerline, high- voltage electrical line conduit, and telecommunication lines that are attached to the bridge.
- Prevent the difficult and potentially dangerous removal of bridge debris from the river that would result if the bridge collapsed.
- Protect park resources from localized flooding that could result from uncontrolled bridge collapse and subsequent damming during a high- flow period.
- Protect and enhance the Merced Wild and Scenic River's Outstandingly Remarkable Values by removing impediments to the free- flowing condition of the river.

The need for the proposed project arose from structural deficiencies coupled with 1997 flood damage that led to the South Fork Bridge being condemned and closed.

Relationship to Other Plans

The Yosemite National Park *General Management Plan*, and the *Merced Wild and Scenic River Comprehensive Management Plan* are the guiding documents for the *South Fork Merced River Bridge Replacement Environmental Assessment*. The proposed project is located within the boundaries of the Merced Wild and Scenic River, which includes the South Fork Merced River. The *General Management Plan* is the overall guiding document for planning in Yosemite National Park. In designating the South Fork and main stem of the Merced as a Wild and Scenic River in 1983, Congress authorized the National Park Service to prepare a management plan for the river by making appropriate revisions to the *General Management Plan* (16 USC 1274(a)(62)). The *Merced Wild and Scenic River Comprehensive Management Plan*, which is a programmatic plan that derives its authority from the Wild and Scenic Rivers Act, made certain revisions to the *General Management Plan* to further the protection of the Merced River and its designated tributaries.

Overview of the Alternatives and Environmental Assessment

The *South Fork Merced River Bridge Replacement Environmental Assessment* presents and analyzes two alternatives. The alternatives are described briefly in this section and in detail in Chapter II, Alternatives. Four additional alternatives were considered and rejected for reasons also described in Chapter II, Alternatives.

Chapter III, Affected Environment, describes the setting and condition of the area affected by the *South Fork Merced River Bridge Replacement Environmental Assessment*. Chapter IV, Environmental Consequences, analyzes the environmental impacts associated with each of the alternatives.

Alternative 1: No Action

The No Action Alternative represents conditions as they currently exist for the South Fork Bridge. It provides the basis for comparison of the Preferred Alternative.

Under the No Action Alternative, the South Fork Bridge would continue to deteriorate and would eventually collapse, likely during high- flow conditions. Bridge- related debris would be deposited downriver and deposition of debris could adversely affect natural, cultural, and scenic resources. Sudden collapse of the bridge could result in serious injuries and/or fatalities to any users in this segment of the river. Utility lines attached to the bridge would rupture, resulting in raw sewage flowing into the river and loss of services for the Wawona Hotel and other facilities for a period of two to five days. Depending upon river flow conditions during a release of raw sewage, the impacts would consist of adversely affecting downstream domestic water supplies, recreation, aquatic wildlife, and vegetation, and would result in regulatory clean- up and abatement orders. The National Park Service would remove bridge debris from the South Fork Merced River as soon as possible following bridge collapse, but retrieval may be delayed for several months until a low- flow period occurs. Any diverted river flows resulting from damming effects of the failed structure could result in erosion of the riverbanks and associated natural and cultural resources. However, over the long term, uncontrolled failure of the South Fork Bridge resulting in pier removal would restore free flow of the South Fork Merced River at this site. The temporary bridge would remain in place to convey Wawona Road vehicle traffic.

Alternative 2: South Fork Merced River Bridge Replacement (Preferred Alternative)

Alternative 2 would entirely remove the existing bridge, replace it with a single- span bridge, and would remove the temporary bridge and access. Alternative 2 would involve separating the South Fork Bridge into liftable segments and removing them with heavy equipment. A temporary containment system would be installed beneath the bridge to catch small amounts of debris that might fall during removal. The smaller debris could include slurry from concrete saws, masonry, and steel fragments. A temporary structural support system may be installed to prevent uncontrolled collapse of the bridge structure during demolition. All construction materials, demolition materials, and the temporary bridge would be hauled to and stored at the Wawona District Materials Storage Area near the National Park Service ranger office. All materials that could be recycled would be reused within Yosemite National Park.

Removal of the South Fork Bridge would have short- term demolition and construction- related impacts on natural, cultural, and social resources. Because demolition and construction would occur in a controlled manner (e.g., within a delineated work area during low- flow conditions with the application of Best Management Practices), Alternative 2 would avoid the more pronounced effects of uncontrolled bridge failure and debris retrieval activities described under the No Action Alternative. Demolition- related impacts would be reduced by application of Best Management Practices and resource- specific mitigation measures described in Chapter II, Alternatives. Regrading and revegetation following construction and removal activities would increase riverbank integrity resulting in beneficial effects on soils, water quality, cultural resources, and biological resources. Controlled bridge removal and construction of a single- span bridge would restore the free- flowing condition to the South Fork of the Merced River, thereby enhancing both its biologic and hydrologic integrity. Alternative 2 would have a long- term, beneficial effect on natural and scenic resources because it would return portions of the riverbank to a more natural state, restore the active flood regime and fluvial processes, and improve views from the riverbank.

Environmentally Preferable Alternative

The Council on Environmental Quality regulations implementing the National Environmental Policy Act and the National Park Service National Environmental Policy Act guidelines require that "the alternative or alternatives which were considered to be environmentally preferable" be identified (Council on Environmental Quality Regulations, Section 1505.2). Environmentally preferable is defined as "the alternative that will promote the national environmental policy as expressed in the National Environmental Policy Act, Section 101. Ordinarily this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative that best protects, preserves, and enhances historic, cultural, and natural resources" (Council on Environmental Quality 1981).

Section 101 of the National Environmental Policy Act states that "… it is the continuing responsibility of the Federal government to … (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations; (2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings; (3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences; (4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice; (5) achieve a balance between population and resource use, which will permit high standards of living and a wide sharing of life's amenities; and (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources." The environmentally Preferred Alternative for the South Fork Merced River Bridge Replacement Project is based on these national environmental policy goals.

Alternative 1: No Action

The No Action Alternative represents conditions and management practices as they currently exist for the South Fork Bridge. Alternative 1 would adversely affect the first provision by not being an effective trustee of the environment for succeeding generations as it allows a condemned bridge located on a major park transportation artery to further deteriorate. The provision of productive and aesthetically and culturally pleasing surroundings (provision 2 of the national environmental policy goals) would be adversely affected due to the uncontrolled collapse of the existing structure and the unattractive character of the temporary bridge. Alternative 1 would not fulfill provision 3 of the goals, because risks to public health and safety would worsen under this alternative due to the uncontrolled failure of the South Fork Bridge. Lastly, Alternative 1 would not preserve natural resources as required under provision 4, because eventual bridge failure would lead to sudden bank erosion and raw sewage flowing into the river that would affect soils, water quality, and biological resources, including riparian vegetation and special- status aquatic species.

Alternative 2: South Fork Merced River Bridge Replacement (Preferred Alternative)

Alternative 2 includes demolition and removal of the existing bridge, replacing it with a bridge with no in- river piers, removing the temporary bridge and access road, and providing site restoration and revegetation. Because demolition would be performed in a controlled manner (e.g., in a designated work area during low- flow conditions), Alternative 2 would avoid the more pronounced adverse effects of uncontrolled bridge failure and subsequent debris retrieval activities described under Alternative 1. The application of mitigation measures described in Chapter II, Alternatives, would further reduce the potential adverse impacts of this alternative.

The provision of aesthetically pleasing surroundings (provision 2 of the goals) would be improved by replacing the existing bridge, removing the temporary Bailey bridge, and providing site restoration. Alternative 2 would fulfill provision 3 of the goals by reducing risks to public health and safety through the controlled demolition of the bridge and application of mitigation measures to reduce hazards to visitors. Alternative 2 would preserve natural and cultural resources, as required under provision 4 of the goals. This alternative would implement measures to reduce adverse effects related to demolition activities using Best Management Practices and includes site restoration to increase riverbank stability and biological integrity.

Environmentally Preferable Alternative

The environmentally preferable alternative is Alternative 2 because of the alternatives considered in detail, it most fully satisfies the national environmental policy goals as stated in Section 101. Alternative 2 would (1) provide a high level of protection of natural and cultural resources while concurrently attaining the widest range of beneficial uses of the environment without degradation; (2) reduce risks to public health and safety; and (3) provide an aesthetically pleasing surrounding.

Chapter I: Purpose and Need

Introduction

The National Park Service proposes to replace the South Fork of the Merced River Bridge (South Fork Bridge) in Yosemite National Park. The South Fork Bridge spans the South Fork of the Merced Wild and Scenic River and is located on Wawona Road within the Wawona developed area (see figure I- 1). Approximately one- third of park visitors travel to the park via Wawona Road, crossing over the South Fork Bridge. As such, the South Fork Bridge is an essential component of Yosemite National Park's transportation infrastructure.

The original South Fork Bridge was constructed in 1931, and was reconstructed in 1938. The bridge was originally constructed as a triple- span, steel girder deck bridge, supported by spread concrete footings, two unreinforced cement rubble abutments, and two unreinforced cement rubble in- stream piers (BPR 1931). It is currently 134- feet long and 29- feet wide, with two 10- foot- wide travel lanes consisting of steel girders, a laminated timber deck, and asphalt surface. Very low concrete barrier walls are in place across both sides of the bridge and no handrails are present. There are no sidewalks or bridle paths on the bridge. The South Fork Bridge was designed and built on a 30- degree skew across the river.

Like several bridges constructed during the 1920s and 1930s, the original South Fork Bridge was characterized by a massive log stringer façade with wooden guardrails, which gave it the appearance of being a rustic log structure (Quin 1991). The wooden guardrails were replaced after the flood of 1938, probably to meet the safety standards of the period. Removal of the decorative timber trim occurred in 1960, when the bridge deck was replaced (Quin 1991). The timber trim was replaced by encasing the sides of the bridge in plain reinforced concrete at a canted angle downward. This action destroyed the historic architectural integrity of the South Fork Bridge. In general, the cobblestone architectural feature encasing the piers and wingwalls is found throughout the historic district of Wawona (Quin 1991).

The bridge is not considered eligible for listing on the National Register of Historic Places on its own, or as an element of the Wawona Cultural Landscape. The National Park Service and the California State Historic Preservation Office have consulted on this determination in 1977, 1993, 1995, and 1996. Historic American Engineering Record (HAER) documentation was completed in 1991, as mitigation for the demolition of the bridge.

History of Proposed Project

During 1992, a structural inspection of the bridge identified deflection (bending) in the steel girders. This required the park to impose weight restrictions, which reduced the load limit from 19 to 7 tons. As a result, the bridge was determined to be critically deficient, but was allowed to remain in service. In a 1993 hydraulic review, a scour hole was discovered under one pier during a subsurface investigation, which resulted in a recommendation for complete reconstruction. The January 1997 flood increased scouring around the piers, further affecting the structural integrity and safety of the bridge. The South Fork Bridge was then condemned and an emergency temporary Bailey bridge was installed to carry Wawona Road traffic.

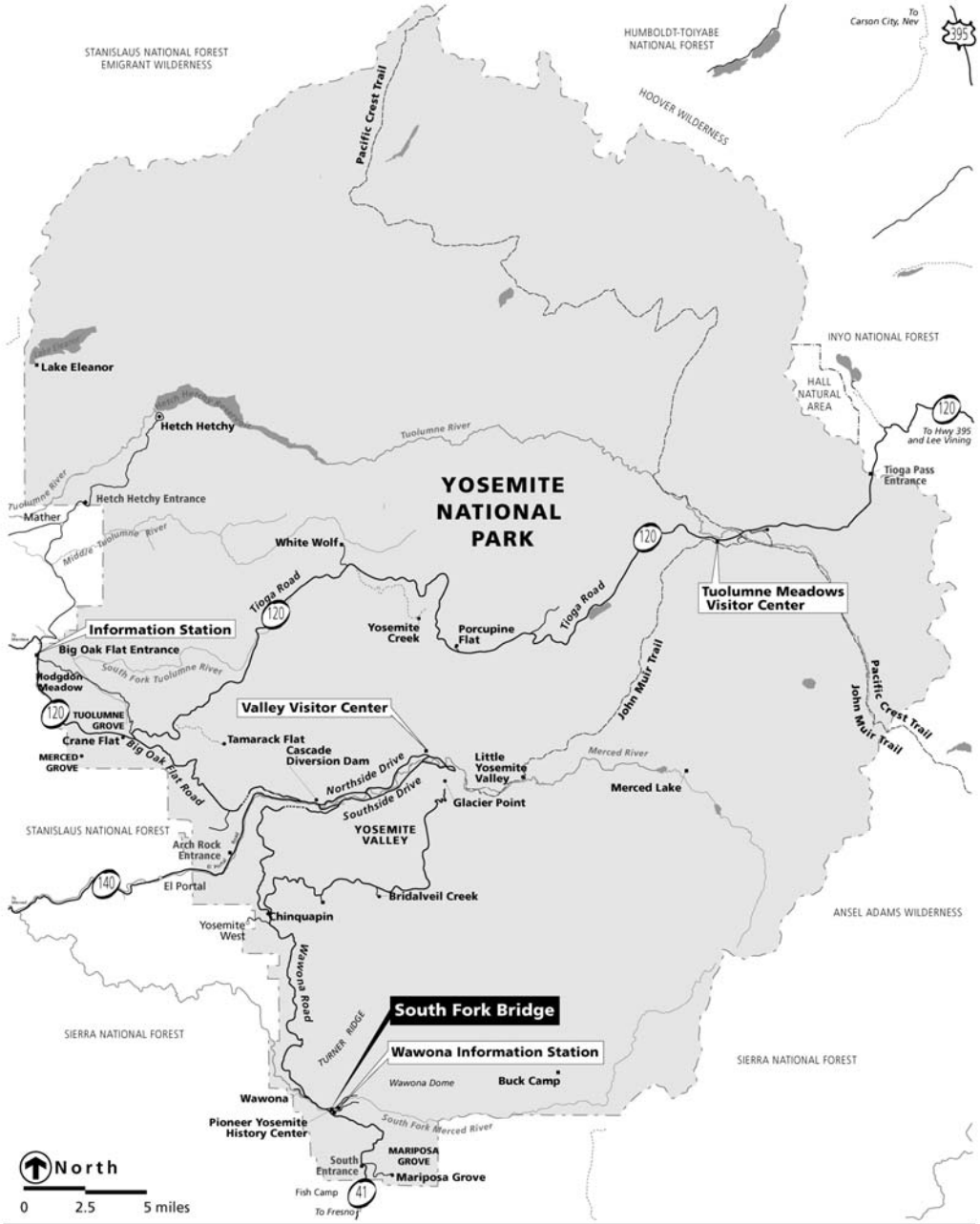


Figure I-1 Yosemite National Park and Vicinity

Original South Fork Bridge (1930s)

NPS Photo

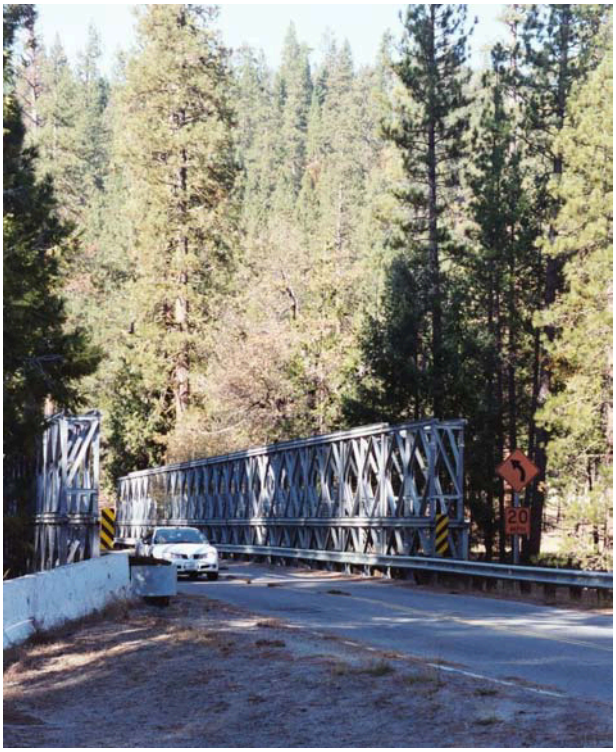
Existing South Fork Bridge (November 2002)

NPS Photo

Temporary Bailey bridge currently carries Wawona Road traffic

NPS Photo

Jersey barrier placement (left) and posted speed limit for the temporary Bailey bridge



NPS Photo

Following installation of the temporary Bailey bridge, the South Fork Bridge was closed to vehicle access by placing concrete Jersey barriers to block access to both ends of the bridge. The Bailey bridge is the current U.S. Army standard design of prefabricated steel panel bridge, built onsite from a pre- engineered system of ready- to- assemble, standardized, prefabricated components (BBI 2002).

The temporary Bailey bridge, which was installed in 1998, has served beyond the original intended use period and has created a visual intrusion on an otherwise popular scenic location (NPS 2002). Although narrow, it has provided reliable passage for traffic on Wawona Road, which serves the annual visitors who enter the park at the South Entrance, or approximately one- third of the total annual visitors.

In 1996, an environmental assessment was released detailing the removal and replacement of the South Fork Bridge, a Finding of No Significant Impact was signed, and the design phase for the project was begun. A 1999 lawsuit on the proposed El Portal Road Improvement Project halted plans to remove and replace the South Fork Bridge until completion of an approved comprehensive management plan for the Merced Wild and Scenic River (NPS 2001). A Record of Decision for the *Merced Wild and Scenic River Comprehensive Management Plan* (Merced River Plan) was signed in August 2000 and revised in November 2000.

Purpose of and Need for the Project

The purpose of the South Fork Merced River Bridge Replacement Project is to remove a hazardous, condemned structure and reconstruct a bridge that will provide adequate and safe vehicle access, be aesthetically appropriate to the scenic nature of the area, and comply with the guidance of the Merced River Plan by restoring a more natural flow in this reach of the South Fork Merced River.

The project is needed for several reasons. A bridge across the South Fork Merced River is an essential piece of park infrastructure, serving along a major travel corridor for one- third of the park's annual visitors, as well as park staff and Wawona residents. The 1980 *General Management Plan* for Yosemite National Park established this route as an auto touring through- route and a trans- Sierra connection that would be maintained for these uses during the life of the Plan. The condemned bridge structure is hazardous and must be removed to prevent a potential failure and collapse. An uncontrolled collapse could not only cause human injury or fatality, but could result in localized flooding, which may damage the South Fork Merced River bank and other park natural and cultural resources.

Although the park has installed a temporary Bailey bridge to accommodate access in the short term, this bridge does not meet the long- term access needs. The bridge was constructed on temporary footings that were not structurally designed to support the typical life span of a permanent bridge. In addition, the Bailey bridge structurally depends on prefabricated steel sections bolted together. This structural design is for short- term use, as constant vibration from ongoing use results in a gradual loosening of the bolts, thus requiring a high level of ongoing inspection and maintenance to ensure structural integrity and safety. The narrow width of the Bailey bridge does not meet safety and transportation capacity standards developed by the National Park Service and based on highway standards from the American Association of State Highway and Transportation Officials. In addition, its prefabricated steel design does not fit with park guidelines related to the preservation and protection of cultural and scenic resource values.

Construction of a new bridge would allow for a design that better protects the scenic values of the Wawona area, provide adequate and safe vehicle access, and provide a safe pedestrian river crossing in the form of the proposed sidewalk.

Planning Context

Relationship to Yosemite National Park Plans

Planning in Yosemite National Park takes two different forms: general management planning and implementation planning. The South Fork Merced River Bridge Replacement Project is an example of an implementation plan. General management plans are required for national parks by the National Park and Recreation Act of 1978.

The purpose of a general management plan is to set a "clearly defined direction for resource preservation and visitor use" (NPS 1998) and provide general directions and policies to guide planning and management in the park. The *General Management Plan* is the overall planning document for Yosemite National Park. In addition to establishing Highway 41 as an auto touring through- route and a trans- Sierra connector, the *General Management Plan* also established specific goals in the Wawona South Entrance and Mariposa Grove of Giant Sequoias areas. Some of these goals included providing bus service to Badger Pass and Yosemite Valley and upgrading physical facilities to eliminate impacts on park resources. The South Fork Merced River Bridge Replacement Project would continue to allow Highway 41 to serve as a primary access route from the south and an auto touring through- route as discussed in the *General Management Plan*.

The Merced River Plan is a general management plan that guides management of the Merced Wild and Scenic River corridor. In designating the Merced River as a Wild and Scenic River, Congress authorized the National Park Service to prepare a management plan for the river by making appropriate revisions to the parks *General Management Plan* (16 USC 1274(a)(62)). The Merced River Plan, which amended the *General Management Plan* provides a framework for decision making on future management actions within the Merced Wild and Scenic River corridor. The South Fork Merced River Bridge Replacement Project complies with conditions outlined in the Merced River Plan.

Implementation plans, which tier from the *General Management Plan* and Merced River Plan, focus on "how to implement an activity or project needed to achieve a long- term goal" (NPS 1998). Implementation plans may direct specific projects as well as ongoing management activities or programs, and provide a more extensive level of detail and analysis. The *Yosemite Valley Plan* is an implementation plan that executes many of the provisions found in the *General Management Plan* while providing more specific detail in carrying out the goals and actions that relate to Yosemite Valley. The *Yosemite Valley Plan* guides protection of natural and cultural resources opportunities for high quality resource- based visitor experience, reduction of traffic congestion, and effective park operations (NPS 2000a). Although the *Yosemite Valley Plan* focuses primarily on Yosemite Valley, it does include actions in other parts of the park such as moving employee housing outside of Yosemite Valley to the Wawona area. The South Fork Merced River Bridge Replacement Project would assist in implementation of the goals of the *Yosemite Valley Plan* through improvements in traffic flow and protection of natural resources. The South Fork Merced River Bridge Replacement Project represents the implementation project that tiers off of the Merced River Plan and *General Management Plan*, while complying with other applicable planning documents and regulations.

Relationship to Other Plans

The 1982 Surface Transportation Assistance Act established the Federal Lands Highways Program that distributes funds from federal motor fuel tax revenues for the construction and rehabilitation of federal roads, including National Park Service roads. The National Park Service has prepared a

plan for a long- term program of road improvement with the intent to preserve and extend the service life of principal park roads and enhance road safety. The Federal Highway Administration executes the design and construction of approved road improvement projects in cooperation with the National Park Service.

As part of the Federal Lands Highways Program, the National Park Service evaluated Yosemite National Park roads and prepared a *Road System Evaluation/Parkwide Road Engineering Study*. This study recommended improving the 6.3 miles of Wawona Road and included rehabilitating or replacing the South Fork Bridge (NPS 1989). The study also suggested that the road and bridge be widened to accommodate 12- foot- wide travel lanes. This project proposes to implement the recommendation for replacing and widening the bridge.

Regulations and Policies

This South Fork Merced River Bridge Replacement Project was written within a complex set of regulations and policies. The environmental assessment must comply with the requirements of the National Environmental Policy Act, within the parameters of other legislation governing land use within Yosemite National Park (see Appendix A).

The Organic Act of 1916 established the National Park Service in order to "promote and regulate the use of parks" and defined the purpose of the national parks to "conserve the scenery and natural and historic objects and wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." This law provides overall guidance for the management of Yosemite National Park. The fundamental purpose of the National Park Service, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, is to conserve park resources and values.

National Park Service Management Policies 2001 provides guidance on addressing impairment of park resources and values. Congress has granted management discretion to allow certain impacts within parks, but that discretion is limited by the statutory requirement that park resources and values be left unimpaired unless a particular law directly and specifically provides otherwise. In this manner, the primary responsibility of the National Park Service was established under the Organic Act, ensuring that park resources and values would continue to exist in a condition that would allow citizens to have current and future opportunities for their enjoyment.

Management Goals

The National Park Service has established management goals that identify long- range direction for Yosemite National Park within the park's *General Management Plan*, *Yosemite Valley Plan*, and the Merced River Plan. Any proposed project must carefully balance multiple goals, especially in a park as large and complex as Yosemite National Park. This section presents the goals from Yosemite's *General Management Plan* and the Merced River Plan.

The *General Management Plan* presents five broad goals for park management; they are carried forward in the *Yosemite Valley Plan* that amends the *General Management Plan*, and include:

- Reclaim priceless natural beauty
- Allow natural processes to prevail
- Promote visitor understanding and enjoyment
- Markedly reduce traffic congestion
- Reduce crowding

The Merced River Plan emulates the goals presented in the *General Management Plan* and *Yosemite Valley Plan*; however, it also presents additional goals specific to management of the Merced Wild and Scenic River. The main stem Merced River and South Fork Merced River were designated by Congress for protection under the Wild and Scenic Rivers Act in 1987. The National Park Service prepared the five goals within the Merced River Plan to further the policy established by the Wild and Scenic Rivers Act, principally to preserve designated rivers in free flowing condition and protect and enhance identified Outstandingly Remarkable Values. The Merced River Plan goals include:

- Protect and enhance river- related natural resources
- Protect and restore natural hydrological and geomorphic processes
- Protect and enhance river- related cultural resources
- Provide diverse river- related recreational and educational experiences
- Provide appropriate land uses

Seven management elements are applied under the Merced River Plan, and they prescribe the desired future conditions, typical visitor activities and experiences, and park facilities and management activities allowed in the river corridor. These management elements are discussed under the Merced Wild and Scenic River section (see Chapter V) of this environmental assessment, as they relate to the proposed action and other alternatives.

Public Scoping

The Council on Environmental Quality requires agencies to make diligent efforts to involve the interested and affected public in the National Environmental Policy Act process (1506.6), regardless of the level of impact and/or documentation. Further, agencies must also encourage and facilitate public involvement in decisions that affect the quality of the human environment. The effort to involve agencies and citizens in determining the scope of issues to be addressed in this environmental assessment is described in this section.

Scoping is used to determine the important issues and eliminate issues that are not important in project evaluation; allocate assignments among the interdisciplinary team members and/or other participating agencies; identify permits, surveys, consultations, etc., required by federal and state agencies; and create a schedule that allows adequate time to prepare and distribute the assessment of effect for public review and comment prior to formulation of a final decision. The scoping process includes all interested agencies, or any agency with jurisdiction by law or expertise, e.g., the Advisory Council on Historic Preservation, the State Historic Preservation Officer, and American Indian tribes, to obtain early participation.

Internal scoping for this environmental assessment was begun October 23, 2002, with an overview meeting among the Yosemite National Park project manager, the project manager of the National Park Service, Denver support offices, and environmental consultants. The environmental assessment management team discussed available data, environmental assessment preparation and time frames, project scoping, and a field site visit. Additional internal scoping for environmental assessment preparation occurred November 11–13, 2002, at Yosemite National Park and culminated in an onsite inspection of the South Fork Bridge site.

This project was originally evaluated under an earlier environmental assessment entitled, *Environmental Assessment, Replace South Fork Merced River Bridge* during 1996. The draft of the 1996 environmental assessment was released for a 30- day public review period beginning April 3, 1996 and ending May 10, 1996. Press releases describing the current proposed action and

requesting comments were issued during September 2002. In addition, Yosemite National Park is committed to holding public open houses to solicit public comment and input for various projects being implemented in the park. The purpose of the open houses is to provide the public with an opportunity to discuss proposed actions and their alternatives, and for the public to provide input and written comments that may be incorporated into the project planning process. The South Fork Merced River Bridge Replacement Project was part of an Open House held on October 23, 2002. An informational hand- out was provided at the October 23, 2002 Open House to those interested in the project. Additional open houses were held on February 26, 2003 and March 28, 2003, and included discussions of the South Fork Merced River Bridge Replacement Project. Quarterly *Planning Update* newsletters issued September 2002 and January 2003 also addressed the project.

Issues and Concerns

The following issues were raised during the public scoping process conducted for this project (see Chapter VI, Consultation and Coordination) and by National Park Service staff. These issues are addressed in the analysis presented in Chapter III, Affected Environment and Chapter IV, Environmental Consequences.

- Yosemite National Park should replace the South Fork Bridge as proposed.
- Yosemite National Park should adopt the proposed South Fork Merced River Bridge Replacement Project because it conforms with other Yosemite National Park plans.
- Yosemite National Park should design the South Fork Bridge to maintain the historic appearance of the original Wawona Bridge.
- The South Fork Merced River Bridge Replacement Project should require a natural appearance for the bridge.
- Yosemite National Park should ensure that the new South Fork Bridge is sufficiently wide.
- The South Fork Merced River Bridge Replacement Project should require 5- foot- wide shoulders.
- Yosemite National Park should employ solar technology and recycled materials in construction projects.

The following issues were raised during the public scoping period, but are considered outside of the scope of this project and are not addressed in the *South Fork Merced River Bridge Replacement Environmental Assessment*.

- Yosemite National Park should prepare a single Draft Environmental Impact Statement that evaluates the cumulative impacts of the Environmental Education Campus, Yosemite Lodge area, Curry Village/East Valley Campground, South Fork Bridge, and El Portal Office Building Plans.
- Yosemite National Park should relocate the temporary bridge in Wawona upstream to improve traffic circulation.
- Yosemite National Park should consider providing public transportation to Wawona.

Organization of this Environmental Assessment

The contents of this document are described by chapter as follows:

- Chapter I, Purpose and Need – The first chapter includes a discussion of the project purpose and need; park purpose, significance, and mission; planning context; relationship to management goals and objectives; and scope of this environmental assessment.

- Chapter II, Alternatives – This chapter presents the project alternatives, including the No Action Alternative, considered by the National Park Service for the replacement of the South Fork Bridge. Mitigation measures are identified, the environmentally preferred alternative is discussed, and a summary table comparing the environmental consequences of the alternatives is provided at the end of the chapter.

- Chapter III, Affected Environment – This chapter provides an overview of the affected environment of the South Fork Bridge and surrounding area. Also described are the existing conditions of natural resources, cultural resources, social and economic resources, and the Merced Wild and Scenic River in the project vicinity.

- Chapter IV, Environmental Consequences – This chapter presents an analysis of the potential environmental impacts of each proposed alternative, including the methods for assessing environmental consequences (i.e., consideration of duration and intensity of impacts in light of measures to mitigate impacts). An explanation of resource impairment follows, and is assessed by alternative, according to National Park Service policy.

- Chapter V, Merced Wild and Scenic River – This chapter summarizes the Wild and Scenic Rivers Act and the Merced River Plan and its seven management elements. Chapter V evaluates consistency of the proposed action with the Merced River Plan and provides a Section 7 determination. A Section 7 determination evaluates the impact of the Preferred Alternative on the condition and values for which the Wild And Scenic River designation was conferred.

- Chapter VI, Consultation and Coordination – This chapter summarizes the process used in preparing and reviewing this environmental assessment, as well as project scoping history. It also lists the government agencies and organizations that were contacted for information, that assisted in identifying important issues and developing alternatives, or that received copies of the administrative review of the South Fork Merced River Bridge Replacement Project.

- Chapter VII, List of Preparers and Reviewers – This chapter lists the names and qualifications of the persons who are primarily responsible for preparing the document and acknowledges those who provided valuable assistance in the environmental assessment preparation.

- Chapter VIII, Glossary and Acronyms – This chapter defines the technical terms and acronyms used in this document, much like a dictionary.

- Chapter IX, Bibliography – This chapter lists the references cited, including technical documents, legal citations, and National Park Service orders and guidance documents.

Chapter II: Alternatives

Introduction

Alternatives considered for the *South Fork Merced River Bridge Replacement Environmental Assessment* include: Alternative 1 – leave South Fork Bridge in its present condition (No Action Alternative) and Alternative 2 – remove and replace the South Fork Bridge (Preferred Alternative). This chapter describes the two alternative approaches for the South Fork Bridge.

Alternative 1: No Action

Under the No Action Alternative, the South Fork Bridge would remain in its present condition, without replacement, maintenance, or repair. The temporary Bailey bridge would continue to serve as vehicle access into the park (see figure II- 1). The No Action Alternative provides a baseline from which to compare the Preferred Alternative, to evaluate the magnitude of proposed changes, and to measure the environmental effects of those changes.

The South Fork Bridge was condemned and closed to vehicle traffic in 1997, and no significant repairs have been made since that time. Limited use is made of the bridge by visitors, hikers, and local residents walking across the structure to avoid the very narrow temporary Bailey bridge. The January 1997 flood resulted in increasing scour around the piers and abutments, first noted as a problem during a 1993 hydraulic analysis (FHWA 1993). In addition, the bridge had already been determined to have steel girder stress and bending problems during a 1992 structural inspection, resulting in a decision to decrease load limits by over 50% (FHWA 1992).

Under the No Action Alternative, no management action would be taken to repair, remove, or replace the bridge. This condition of benign neglect would eventually result in the collapse of a portion of the bridge, causing release of bridge debris into and possible bank erosion of the South Fork Merced River. Further natural resource damage would result from raw sewage entering the river and impacts resulting from removing debris from the downriver reach following a collapse.

In 1987, a Historic Resource Study concluded that the South Fork Bridge was not eligible for listing due to damage and reconstructions (since the original construction in 1931) that had compromised the architectural and historic integrity (NPS 1987a). In 1995, the California State Historic Preservation Office concurred that "the structure has no strong associations with historic events or persons, nor is it architecturally significant" (COHP 1995). In addition, in 1991, through the Yosemite National Park Roads and Bridges Recording Project, the South Fork Bridge was documented to HAER standards, which included historical and descriptive data, measured drawings, and archival photographs (HAER No.CA- 113). Such documentation and historic resource determinations have been considered in decisions made relative to the lack of maintenance and repair of the South Fork Bridge.

As the bridge deteriorated, management actions would be required to move and reinstall a waterline and a raw sewage line, electrical conduits, and telecommunication conduits currently attached to the South Fork Bridge. Knock- outs (holes larger than the diameter of the existing pipelines and conduits) are present on the temporary Bailey bridge along the abutments to allow for a temporary reroute of the existing utility lines. However, the elevation of the temporary bridge could require additional installation of one or more lift stations to provide adequate flow of sewage and reclaim water across the structure.

Alternative 2: South Fork Merced River Bridge Replacement (Preferred Alternative)

The Preferred Alternative identifies removal of the existing triple- span South Fork Bridge and replacement with a new single- span bridge in the same location (see figure II- 2). The new bridge would be approximately 150- feet long and 42- feet wide. The new bridge would be approximately 13- feet wider and 16 feet longer than the old bridge to accommodate wider travel lanes, shoulders, and a new 5- foot- wide sidewalk. The new structure height would be similar to that of the present structure, although the height of the safety railing would be raised to 2- feet, 8- inches in order to meet current safety standards. The new bridge would span the entire South Fork Merced River without the need for center support piers, thus restoring a more natural flow through this river reach. The appearance of the bridge would be made similar to the existing bridge by incorporating a natural river cobble façade around railing pedestals and interior approach walls and a river rock formliner pattern on the face of the abutments, wingwalls, and exterior approach walls formed from an existing South Fork Bridge pier/abutment rock face. A small dirt area immediately northeast of the bridge, which was previously used as an informal parking area, would be revegetated.

Under Alternative 2, utility lines attached to the existing South Fork Bridge would be transferred to the temporary Bailey bridge during demolition and removal of the existing bridge and construction of the new bridge. When traffic and utility lines are rerouted onto the new bridge structure, the temporary Bailey bridge would be removed, along with the approaches and temporary abutments, and the site restored. The contractor staging area would be in the Wawona District Material Storage Area, near the National Park Service ranger office, about 0.4 mile east of the bridge (see photo below).

Wawona District Materials Storage Area

NPS Photo

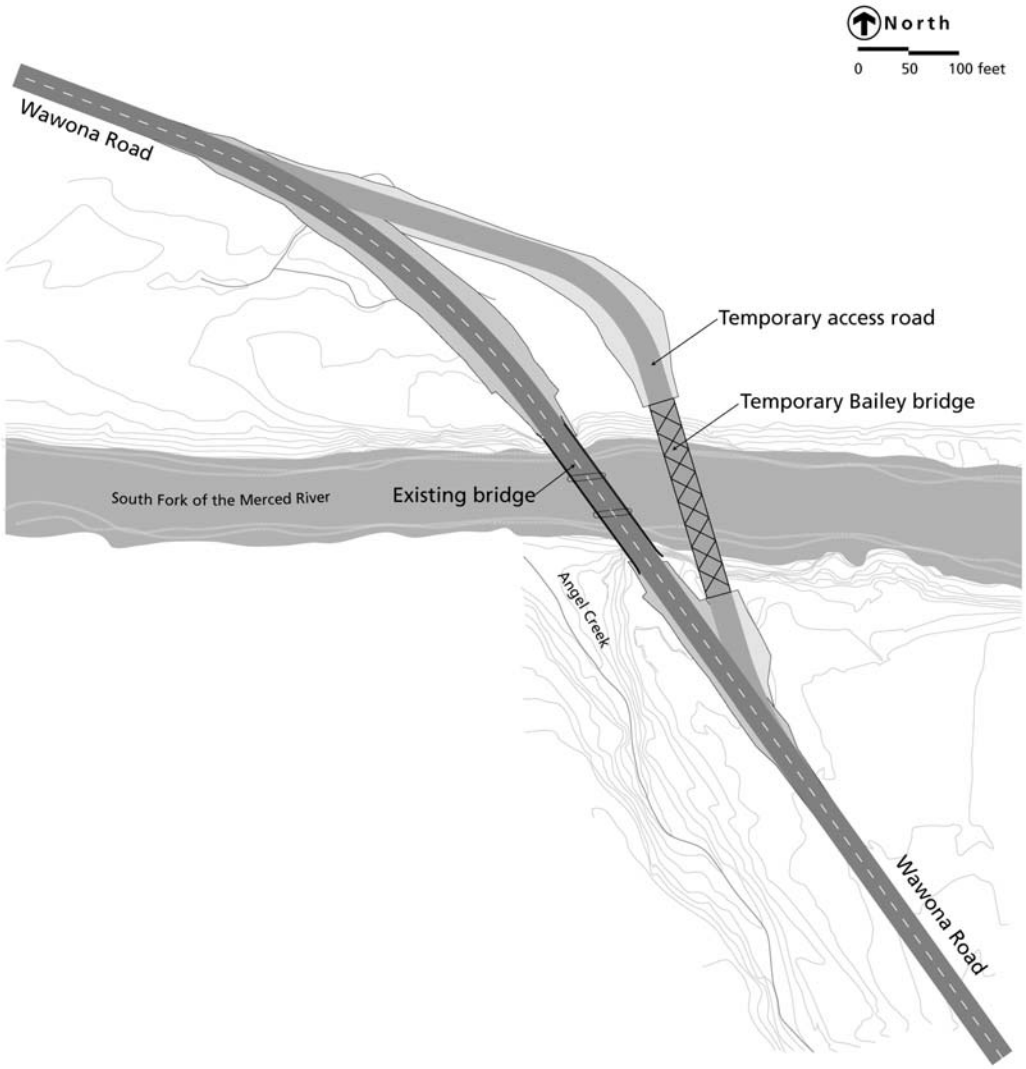


Figure II-1 Existing South Fork Bridge and Temporary Bailey Bridge

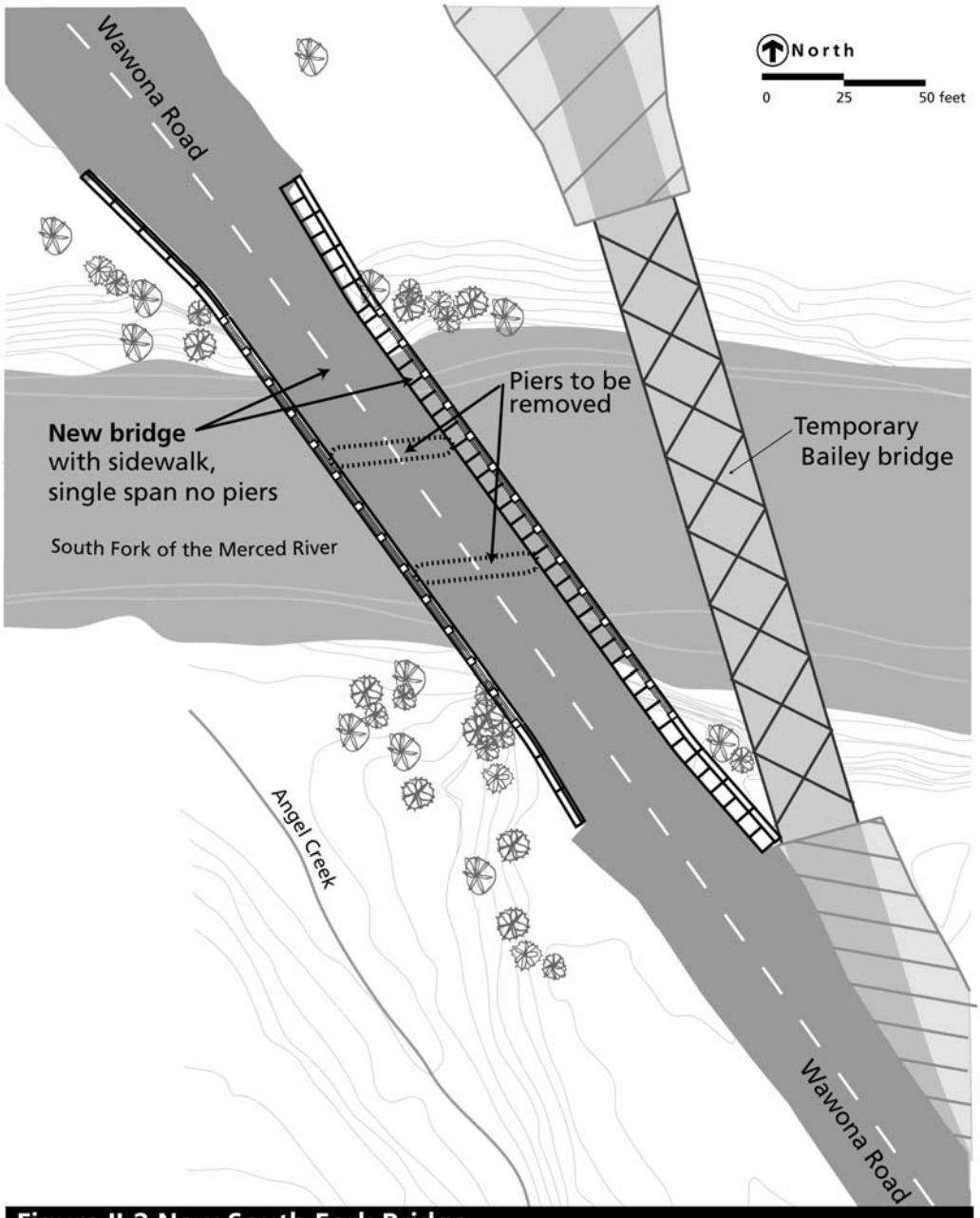


Figure II-2 New South Fork Bridge

The new South Fork Bridge will be designed according to American Association of State Highway Transportation Officials Bridge Standards. All proposed facilities would comply with applicable laws and regulations for accessibility, specifically the 1968 Architectural Barriers Act (Public Law [PL] 90- 480), the 1973 Rehabilitation Act (PL 93- 112), and the 1984 Uniform Federal Accessibility Standards. In addition, significant architectural features from the existing bridge would be incorporated into the new design. Construction for this project is expected to last approximately 13 months, starting about September 2003, with completion anticipated by October 2004.

Containment System

A temporary containment system consisting of a reinforced tarp, netting, cage, or floating steel tubs would be positioned beneath the South Fork Bridge to prevent small debris and cement slurry, among other items, from entering the South Fork Merced River. As the bridge is dismantled into small enough segments for safe removal, the containment system would capture errant pieces of material (mostly concrete, rock, and steel) to prevent accidental fall into the river. It would also be left in place during construction activities to capture construction debris and may be anchored to the existing structure or connected to a structural support system.

Structural Support System

A temporary structural support system may be installed to prevent the uncontrolled collapse of the South Fork Bridge structure during demolition or to anchor the containment system. Additional support for the containment system may be necessary to supplement anchoring to the existing structure. The structural support system would include either scaffolding, jacks, or mechanical lifts positioned on tracks.

If a structural support system is used, it would be placed on the base of the existing piers prior to their complete removal or other methods would be used, which provide support and minimize, to the extent possible, disturbance to the active channel. Supports would be placed at intervals beneath the bridge using small wheeled or tracked equipment to assist with the placement and eventual removal of demolition debris. To provide riverbank protection, this material and equipment would be lifted from the bank by crane and placed on the bed or would be driven on a ramp to the riverbed. This ramp would be located and installed to avoid impacts to the riverbank, aquatic species, and riparian vegetation.

Demolition and Removal Activities

South Fork Bridge demolition would involve removing the curbs, rails, and asphalt surface from the bridge deck; the wooden bridge deck; steel beams below the bridge deck; and abutments, wingwalls, and piers. Demolition activities would also involve separating the bridge into pieces that can safely be removed from the site by truck and removing the pieces by crane or other applicable equipment located on the riverbank. The load limit and equipment size would be restricted to protect the established native vegetation. HAER documentation was completed in 1991 as mitigation for the bridge removal.

Most of the demolition and construction work would occur at or above the ordinary high- water mark of the river (see Chapter VIII, Glossary and Acronyms), with the exception of possible installation of the temporary structural support system. Minor amounts of dry concrete, soil, gravel, and demolition debris (dust and similar small- sized material) may periodically wash into

the river. These would be infrequent events of short duration, and such material would flush through the river system.

Bridge demolition work would be completed within a four- month period (September through December) beginning at project initiation. Several different types of construction equipment would be used in demolishing the existing bridge. The range of potential equipment that would be used is listed below:

- cranes
- excavators
- backhoes
- skid loaders
- trucks
- boulder buster
- graders
- jack hammers
- concrete saws
- jacks
- oxy- acetylene torches

The use of explosives for blasting or helicopters for lifting would not be allowed.

Construction Activities

After completion of demolition activities and relocation of the utility lines, construction of the proposed replacement bridge would begin. During construction of the new bridge, traffic would continue to be routed over the temporary Bailey bridge so there would be minimal impact on current traffic flows. There would be some light traffic from trucks and equipment used for constructing the new bridge. Traffic signs or message boards would be installed to inform the public of any temporary detours or delays during construction. Orange snow fencing would be installed around the entire work area so that resources and operations would not be disturbed outside the work limits. A chain link fence would be installed around the proposed staging area. It is anticipated this project would occur over an approximate 13- month period; therefore, the appropriate winter shutdown and high- water emergency action plans would be required for this project.

The proposed construction includes the following:

- Cofferdams (see Chapter VII, Glossary and Acronyms) would be constructed for placement of the reinforced concrete abutments, with dewatering to a sedimentation pond.

- Excavation and placement of new reinforced concrete abutments and wingwalls would occur upstream and downstream of the existing abutments. After placement of all concrete, trucks would be cleaned out into sedimentation basins. The only fill that would enter the river channel is the material required to place and protect the abutments and wingwalls.

- The proposed bridge deck would be supported by single- span, cast- in- place, reinforced concrete box girder. This girder would be placed by installing temporary false work (see Chapter VIII, Glossary and Acronyms) across the river channel that would support the cast- in- place concrete beams. Some wheel- or track- mounted equipment would be required for installation of this false work, such as a backhoe. Utility chases (grooves or slots – locations to install utilities) would be incorporated into the construction of the box girder to allow for placement of the existing utility lines and some spare chases for future lines.

- The cast- in- place reinforced concrete deck would be installed over the concrete girder, which would again include temporary false work required to support the concrete until cured. When the concrete deck is completed, the false work would be removed from the river channels and only the remaining restoration work would be required along the banks of the river channel around the abutments and wingwalls. The underside of the decking would be formed to allow for bat roosting habitat, providing cover and footholds.

- After completion of the concrete deck, the concrete pedestals (with natural river cobble façade) and cedar log rails would be installed, along with a 5- foot concrete sidewalk on the upstream side.

- The existing utilities would then be relocated from the temporary Bailey bridge onto the new bridge.

- The approach road and concrete deck would then be surfaced with asphalt pavement.

- The temporary Bailey bridge and the transitional road segments would be removed, and the area surrounding the temporary bridge site would be restored to natural conditions.

- The existing asphalt roadway would be pulverized in place and used as a base for new pavement.

- Voids in the riverbanks related to abutment and wingwall removal would be recontoured and reconstructed to accommodate the new abutments and wingwalls supporting the new structure.

General Site Access and Construction Staging

The South Fork Bridge is located between the Chilnualna Falls Road and Forest Drive access roads near the ranger office, shuttle bus area, and the Wawona Store (see figure II- 3). Construction access to the site would be provided from these roads, and from the blocked and abandoned segments of Wawona Road. Additional access to the bridge is available from the existing unpaved parking area south of the South Fork Bridge and west of Wawona Road. Due to the location of the staging area within the Wawona District Materials Storage Area, it is anticipated that Chilnualna Falls Road would provide the principal construction equipment access route.

Flag persons would assist visitor movements, as necessary, to ensure visitor safety during bridge removal and construction activities. The perimeter of the work area would be delineated with warning signs, as necessary, to inform park visitors. Notices regarding demolition and construction activities would be posted on the park's web site, in the *Yosemite Today* newspaper, and in the Daily Report.

Damage to all access routes caused by project- related activities shall be repaired upon completion of the South Fork Merced River Bridge Replacement Project, to restore roads to pre-construction conditions.

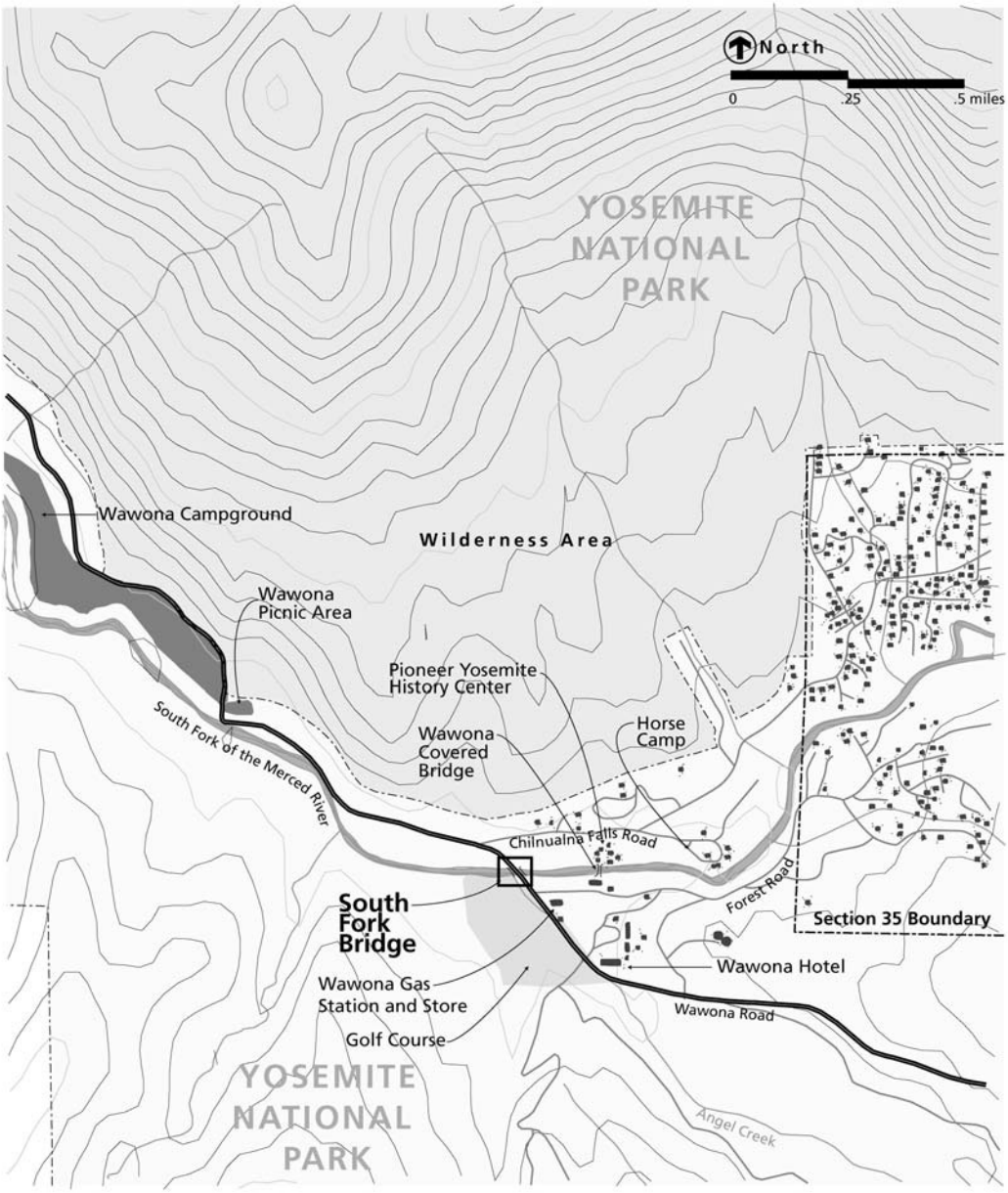


Figure II-3 Wawona Area Map

Material Disposal and Recycling

No disposal of bridge materials such as concrete, wood, or metal would occur within the boundaries of Yosemite National Park. Materials would be temporarily stored at the Wawona District Material Storage Area prior to disposal at an approved recycling facility. Consistent with the National Park Service *Guiding Principles of Sustainable Design* (NPS 1993a), recycling of the demolition debris, to the maximum extent practicable, would be encouraged in construction contracts.

Site Restoration and Cleanup

Upon completion of the bridge construction and demolition of the temporary Bailey bridge, all tools, equipment, barricades, signs, surplus materials, and rubbish shall be removed from the project work limits. Any asphalt surfaces damaged due to work on the project shall be repaired to original condition. All demolition debris shall be removed from the project site, including all visible concrete and metal pieces.

All disturbed areas shall be graded to the approximate original contour and to establish positive drainage, and raked smooth to eliminate tire tracks. Compacted soils, such as under temporary road surfaces, may also require loosening by ripping with a dozer, tractor, or similar mechanism. Topsoil shall be replaced in the graded areas followed by revegetation.

The National Park Service shall prepare a prescription for revegetating any disturbed areas (including riverbanks) to be included in the construction specifications. This prescription shall comply with the *Yosemite Valley Plan* (NPS 2000a). Revegetation of disturbed sites shall be conducted by park staff immediately following construction to reduce the potential for non-native plant invasion. All plant material shall be from genetic stocks indigenous to Wawona, including trees, shrubs, and forbs obtained from the construction site by salvage methods or by propagating container plants from seed or cuttings (e.g., lupine and grass seed collected on the project site, and seedling white alder trees, etc.). Native seed used for replanting shall be collected from the park.

Stormwater management measures implemented during construction shall remain in place until vegetation is established. Accepted erosion protection measures for revegetated areas, including jute mesh and hydro mulch, may be used, if necessary, to prevent soil loss.

The reclaimed areas shall be monitored on a frequent basis to determine if the reclamation is successful and to implement any additional remedial efforts. Remedial actions could include installation or maintenance of erosion protection measures or stormwater management controls, reseeding and/or replanting the areas, and controlling invasion of non- native plant species.

Timing

The U.S. Army Corps of Engineers requires that demolition and construction activities occur during low- water months. In- channel activities, therefore, would occur during the fall of 2003 when flow of the South Fork Merced River is expected to be less than 100- cubic feet per second (cfs). If in- channel activities are not completed in 2003, work will commence in the channel during low- flow periods in the summer of 2004. Bridge demolition and construction would be avoided during higher flow periods.

Merced Wild and Scenic River Management Plan Elements

Because the South Fork Bridge is located within the bed and banks of the South Fork Merced River, Alternative 2 must comply with the management elements prescribed in the Merced River Plan. The management elements include: boundaries, classifications, Outstanding Remarkable Values, Wild and Scenic Rivers Act Section 7 determination process, River Protection Overlay, management zoning, and implementation of a Visitor Experience and Resource Protection (VERP) framework. Chapter V, Merced Wild and Scenic River, discusses the consistency of the proposed action with the Merced River Plan elements. The Wild and Scenic Rivers Act Section 7 determination is included in Appendix B.

Regulatory Compliance

All demolition activities within the river channel would conform to applicable provisions of the Clean Water Act, such as a Section 404 permit, and with state and local regulations concerning sediment releases, turbidity, and prevention of water pollution. Best Management Practices would be required to control erosion within the worksite and to prevent potential contamination of water due to the operation of heavy construction equipment (i.e., all permit requirements would be met).

Alternatives Considered but Dismissed

During preparation of the 1996 environmental assessment, an alternative was considered that would replace only the South Fork Bridge superstructure while leaving the abutments and piers in place. This alternative was dismissed for the following reasons.

- The abutments and piers are not constructed to current design standards (e.g., American Association of State Highway Transportation Officials, etc.) for seismic conditions.
- The footings are severely undermined as shown in the 1993 hydraulic review. Additional undermining of the footings occurred during the 1997 flood.
- Reconstructing the abutments and piers with the bridge superstructure in place would be economically infeasible. In other words, the bridge would essentially need to be torn down in order to economically reconstruct the piers and abutments.
- The bridge structure is not of historic significance or eligible for listing on the National Register of Historic Places due to architectural changes made to the bridge in 1960.
- Leaving the bridge piers within the Merced Wild and Scenic River is inconsistent with the Merced River Plan goal to protect and restore natural hydrologic and geomorphic processes (NPS 2001).

An alternative that would use the temporary Bailey bridge as the primary Wawona Road access and leave the existing South Fork Bridge as a pedestrian bridge was considered and also dismissed. This alternative was dismissed for the following reasons.

- The temporary Bailey bridge was not designed for permanent use and is constructed on temporary footings.

- The Bailey bridge structural design is for short- term use, as constant vibration from ongoing use results in gradual loosening of the bolts holding the sections of the bridge together, requiring significant ongoing inspections and maintenance to ensure structural integrity and safety.

- The bridge lanes are too narrow and the restriction causes a reduction in traffic speeds and associated congestion at the entrance to the bridge.

- The continued use of the temporary Bailey bridge and the South Fork Bridge increases the overall permanent impact at the site.

- The existing South Fork Bridge would require ongoing maintenance to protect utility lines and pedestrian usage.

- Maintenance of both bridges would require additional costs throughout their life.

- Both bridges represent unacceptable safety risks to the public—the temporary Bailey bridge through the potential for accidents due to the narrowness of the structure, and the South Fork Bridge due to the potential for collapse as a result of scouring of the piers.

- Leaving the South Fork Bridge piers within the Merced Wild and Scenic River is inconsistent with the Merced River Plan goal to protect and restore natural hydrologic and geomorphic processes (NPS 2001).

A third alternative to construct a triple- span replacement bridge was rejected since it did not meet one of the primary objectives of the Purpose and Need for the project, which is to restore the free- flowing condition of the river in this area, nor did it meet the goals of the Merced River Plan to protect and restore natural hydrologic and geomorphic processes (NPS 2001).

Demolition of the existing bridge without providing for a permanent replacement was also considered and rejected since this alternative would not fit within the Purpose and Need for the project, which is to maintain Highway 41 as the primary access road into the park from points south of the park, consistent with the *General Management Plan* (NPS 1980).

Mitigation Measures for the Preferred Alternative

To ensure that implementation of the proposed project protects natural and cultural resources, Outstandingly Remarkable Values, and the free- flowing condition of the South Fork reach at Wawona, a consistent set of mitigation measures would be applied. As part of the environmental review, the National Park Service would avoid, minimize, and mitigate impacts to the extent practicable. As such, the project shall avoid or minimize impacts to natural and cultural resources and be designed to work in harmony with the surroundings, particularly the Wawona cultural landscape. The project shall reduce, minimize, or eliminate air and water nonpoint source pollution. The project shall be sustainable whenever practicable by recycling and reusing materials, minimizing materials, and minimizing energy consumption during the project.

Best Management Practices

Best Management Practices shall be implemented, as appropriate, prior to, during, and/or after project completion. Specific Best Management Practices shall include, but are not limited to, the following:

- The National Park Service project manager shall ensure that the project remains confined within the parameters established in the compliance document, U.S. Army Corps of Engineers Section 404 permit, etc. The National Park Service project manager shall ensure that mitigation measures are properly implemented.

- A natural resource protection program shall be implemented using standard measures such as construction scheduling, erosion and sediment control, use of fencing or other means to protect resources adjacent to the project area, removal of all food- related items or rubbish to bear- proof containers, regrading, and revegetation. Food shall be stored in accordance with park regulations.

- Small, wheeled or tracked equipment shall be allowed to enter the river to assist in the placement of a containment system and a structural support system or to remove demolition debris from the river. To protect the riverbank, this equipment shall be lifted from the riverbank by crane and placed on the riverbed, or shall be driven on a ramp into the riverbed. Heavy equipment used within the bed and banks of the South Fork Merced River should be placed on mats, or other measures would be taken to minimize disturbance.

- The load limit and equipment size shall be restricted to protect nearby utility lines and established native vegetation.

- All construction equipment shall be stored within the delineated work limits and/or at the Wawona District Materials Storage Area.

- Measures to reduce effects of demolition and construction on visitor safety and experience shall be implemented. Visitors, contractors, and park personnel shall be safeguarded from demolition and construction activities. A barrier plan indicating locations and types of barricades shall be used to protect public health and safety.

- An emergency notification program shall be in place. Standard measures for emergency notification include:

  - Notify utilities and emergency response units prior to demolition and construction activities, which require translocating utilities to the temporary Bailey bridge
  - Identify locations of existing utilities prior to activity to prevent damage to utilities during translocation activities
  - Contact Underground Services Alert 72 hours prior to any ground disturbance
  - No demolition or construction activity shall be allowed until the process of locating and translocating existing utilities is complete

- All tools, equipment, barricades, signs, surplus materials, and rubbish shall be removed from the project work limits upon project completion. Any asphalt surfaces damaged due to work on the project shall be repaired to original condition. All demolition debris shall be removed from the project site, including all visible concrete and metal pieces.

- Disturbed areas shall be graded and raked smooth to eliminate tire tracks and tripping hazards.

Resource-Specific Mitigation Measures

This section describes resource- specific measures to mitigate impacts to the natural, cultural, and social environments in the project vicinity.

Geology, Geohazards, and Soils

- Conduct geotechnical and soils investigations as warranted to avoid or minimize geohazards
- Provide erosion and sediment control
- Remove topsoil from areas of construction and store for later reclamation use

Hydrology, Water Quality, and Floodplains

- Demolition debris larger than 2- inches in any dimension that inadvertently falls into the river shall be removed during demolition and construction.
- A spill prevention and pollution control program for hazardous materials shall be implemented. An adequate hydrocarbon spill containment system (i.e., floatable absorption boom, absorption materials, etc.) shall be available onsite in case of unexpected spills in the project area. Construction equipment shall use, to the extent possible, environmentally friendly fuels and lubricants (e.g., biodegradable vegetable-based oil) and shall be regularly maintained and inspected to prevent any fluid leaks and shall be repaired of all hydrocarbon leaks prior to working near the South Fork Merced River. Contractors would promptly clean up any leakage or accidental spills from construction equipment, including hydraulic fluid, fuel, or anti- freeze. All equipment allowed within the river channel shall be equipped with a hazardous spill kit. Standard measures include:

    - Hazardous materials storage and handling procedures
    - Spill containment, cleanup, and reporting procedures
    - Limiting refueling and other hazardous activities to upland/nonsensitive sites (Wawona District Materials Storage Area)

- Stormwater management measures shall be implemented, as necessary, to reduce nonpoint source pollution discharge from paved and other impervious surfaces. Included are street sweeping and the use of permeable surfaces and vegetated or natural filters to trap or filter stormwater runoff.

    - Sediment traps, erosion check screens, cofferdams, and/or filters shall be used to reduce stream sediment loading caused by bridge demolition and construction.
    - Equipment operation in the river shall be kept to a minimum.
    - All excavated material or deleterious material (i.e., old asphalt road surface, etc.) shall be handled and disposed in a way that prevents entry into the river.
    - The existing bridge would be removed completely from the river.
    - Excess excavated material shall be used as fill (if fill is needed) or disposed outside the park.
    - The new bridge shall be single- span and not change stream gradients or create fish barriers.
    - Initial bank protection material shall consist of clean rock.
    - All construction materials shall be provided by the contractor from sources outside the park.
    - The batch plants for mixing asphalt concrete, cement concrete, and the waste site shall be located outside the park.
    - Areas for truck and equipment staging, storage, and turn- arounds shall be located on previously disturbed sites (Wawona District Materials Storage Area) or on the reconstructed approaches.

- The demolition and construction shall comply with provisions of the California Regional Water Quality Control Board, Central Valley Region and the U.S. Army Corps of Engineers permit.
- The U.S. Army Corps of Engineers issued Permit No. 199600370 for the South Fork Merced River Bridge Replacement Project (USACE 1996). This permit expired on December 10, 2001, and the National Park Service is coordinating with the U.S. Army Corps of Engineers to ensure that a current permit will be in place prior to project implementation. The permit will require submittal of the *South Fork Merced River Bridge Replacement Environmental Assessment*. The permit will also require mitigation for potential project- related impacts to water quality, aquatic resources, and endangered species. Such mitigation is likely to include soil erosion and sediment controls, construction techniques, and limits on construction timing for work in the South Fork Merced River.

Wetlands

- Avoid adverse impacts to wetlands. If avoidance is not feasible, minimize and compensate adverse effects to wetlands in accordance with Executive Order 11990 (*Protection of Wetlands*), the Clean Water Act, and Director's Order 77- 1.
- Prepare and implement restoration and/or monitoring plans as warranted. Plans shall include methods for implementation, performance standards, monitoring criteria, and adaptive management techniques.

Vegetation

- Avoid trees, shrubs, and herbaceous vegetation growing onsite to the maximum extent practicable, using temporary barriers for protection, as necessary. Of particular importance are the very large ponderosa pine and incense- cedar trees growing adjacent to Angel Creek southwest of the bridge. Because widening for the new structure occurs mostly on the eastern side, it may be possible to avoid the white alder, ponderosa pine, and incense- cedar trees near the western side of the existing bridge abutments. Willow shrubs growing along the low- flow channel will also be avoided to the extent practicable. If avoidance is not feasible, written permission from the National Park Service project manager must be granted prior to proceeding with demolition/construction activities.
- Only remove trees within the construction zone, including those already removed due to bypass bridge replacement. Remove trees outside the construction area only if absolutely necessary, and then only following consultation between the construction supervisor and appropriate park staff.
- Do not fasten ropes, cables, or fencing to trees.
- Immediately treat trees damaged during construction activities with sodium tetraborate decahydrate to prevent root rot infection.
- The National Park Service shall prepare a prescription for revegetating any disturbed areas (including riverbanks) to be included in the construction specifications. This prescription shall comply with the *Yosemite Vegetation Management Plan* (NPS 1997a). Revegetation of disturbed sites shall be conducted by park staff immediately following construction to reduce the potential for non- native plant invasion. All plant materials shall be from genetic stocks indigenous to Wawona, including trees, shrubs, and forbs obtained from the construction site by salvage methods or by propagating container plants from seed or cuttings (e.g., lupine and grass seed collected on the project site, and seedling white alder trees, etc.). Native seed used for replanting shall be collected from the park.
- Ensure control of importation of non- native plant species. Standard measures shall include the following:

  - Heavy equipment shall be steam cleaned to prevent importation of non- native species. Ensure construction equipment arrives onsite free of mud or seed-bearing material.
  - Certify all seeds and cover material as weed- free.
  - Identify nearby areas with non- native species prior to construction.
  - Avoid spreading non- native species within the project area.
  - Revegetate with appropriate native species, including seedlings.

- Ground surface treatment shall include grading to natural contours, topsoiling, seeding, and planting. Accepted erosion protection measures, including jute mesh and hydro mulch, may be used, if necessary, to prevent soil loss.
- Frequently monitor reclaimed areas after construction to determine if reclamation efforts are successful or if additional remedial actions are necessary. Remedial actions could include installation of erosion control structures, reseeding, and/or replanting the area, and controlling non- native plant species.

Wildlife

Bird Species

- To avoid conflicts with nesting birds, conduct activities outside the breeding season (typically from March to August).
- Remove trees or structures with unoccupied nests (stick nests or cavities) prior to March 1, or following the nesting season. If any special- status species is observed nesting, a determination shall be made as to whether or not the proposed action will impact the active nest or disrupt reproductive behavior. If it is determined that the action will not impact an active nest or disrupt breeding behavior, work shall proceed without any restriction or mitigation measure. If it is determined that bridge removal/construction activities will impact an active nest or disrupt reproductive behavior, then avoidance strategies shall be implemented.

Special-Status Species

Special- Status Aquatic Species

Implementation of the following conservation and protection measures would reduce or eliminate potential taking of special- status aquatic species.

- Work activities within potential special- status aquatic species habitat shall be completed during low- flow conditions.
- All work adjacent to or within aquatic habitats shall be regularly monitored.
- All fueling and maintenance of vehicles and equipment shall occur outside any aquatic habitat.
- The total area of activity shall be limited to the minimum necessary to achieve the project goal, as determined collaboratively with contractors and National Park Service staff (including resources management staff).
- During dewatering, intake shall be completely screened with wire mesh not larger than 5 millimeters to prevent aquatic species from entering the system. Release or pump water downstream at an appropriate rate to maintain downstream flows during work. Upon completion of activities, remove barriers to flow in a manner that allows flow to resume with the least disturbance to the substrate.

Special- Status Species of Bats

- A qualified biologist shall conduct surveys in the summer and immediately prior to bridge removal/construction to determine whether trees or other habitat that would be affected by the proposed action provides hibernacula or nursery colony roosting habitat.
- If summer surveys reveal that the site is being used as a nursery colony, the action shall not occur until after August 15, when the pups are weaned and are able to fly.
- If surveys conducted immediately prior to bridge removal/construction do not reveal any bat species present within the project area, then the action shall begin within three days to prevent the destruction of any bats that could move into the area after the survey.
- Snags shall not be removed without prior approval from a National Park Service wildlife biologist and/or plant ecologist. Riparian vegetation shall be retained to the extent possible to preserve important foraging habitat.

Air Quality

- A dust abatement program shall be implemented. Construction contractors shall implement the following measures to reduce fugitive dust:
  - Water all active work areas, access roads and paths, parking areas, and staging areas as often as necessary to control dust (use of dust abatement products shall not be allowed).
  - Cover all loads of demolition debris and other loose materials that could blow from a moving vehicle or otherwise spill onto paved surfaces, or require all trucks to maintain at least 2 feet of freeboard.
  - All paved areas that are subject to vehicle and pedestrian traffic shall be cleaned of construction debris and soil. Sweeping of these areas shall be conducted, as necessary.
  - All stockpiles shall be covered.
  - Traffic speeds on unpaved roads and paths shall be limited to 5 miles per hour.
- Vehicle emission controls shall be implemented, along with the following measures:
  - Use California on- road biodiesel fuel for all diesel- powered construction equipment.
  - Use construction equipment that is properly tuned and maintained in accordance with manufacturer specifications.
  - Use Best Management Practices for construction practices to avoid unnecessary emissions (e.g., engines of trucks and equipment in loading and unloading areas would be turned off when not in use).

Cultural Resources

- Ensure an archeologist and American Indian monitor are present during ground-disturbing construction activities.
- Advise construction employees of appropriate actions should cultural resources be encountered during project construction.
- Should previously unknown archeological resources be uncovered during construction, stop work in the discovery area and the National Park Service shall consult according to 36 CFR 800.11 and, as appropriate, provisions of the Native American Graves Protection and Repatriation Act (1990).
- Conduct bridge demolition in accordance with the park 1999 Programmatic Agreement and Appendix E of the *Yosemite Valley Plan*. Standard mitigation measures include

recordation, salvage, and interpretation. Efforts shall be made to avoid impacts through use of the *Secretary of the Interior Standards and Guidelines for Archeology and Historic Preservation*.
- Salvage any architectural elements of the South Fork Bridge that are determined to be feasible to salvage.

Visitor Experience

- No demolition/construction work shall be allowed on weekends or federal government holidays without prior written approval of the Superintendent. In order to minimize disruption to nearby park visitors, all construction work generating noise levels above 76 dBA (decible on the A- weighted scale), such as the operation of heavy equipment, shall be performed between 8:00 A.M. and 5:00 P.M. These hours could be expanded pending approval of the park superintendent.
- Standard noise abatement measures shall be implemented during demolition. Trucks and other construction equipment shall be fitted with standard muffling devices and shall not be excessively loud. Standard noise abatement measures include the following elements:

  - Construction scheduling to minimize impacts to adjacent noise- sensitive uses (golf course, campground, picnic areas, etc.) primarily between 8:00 A.M. and 5:00 P.M., with other hours requiring park superintendent approval
  - Use of the best available noise control techniques whenever feasible
  - Location of stationary noise sources as far from sensitive public use areas as possible

- Vehicle traffic flow would be maintained as much as possible during construction; however, some delays of up to 30 minutes could occur. Some periods during construction could result in longer delays due to the nature of the work being performed, and at such times would be approached as follows:

  - Alert park staff as soon as possible if delays longer than normal are expected.
  - Inform the traveling public of construction- related delays through media outlets.
  - Tour and shuttle buses would be permitted to meet schedules and not be delayed more than 15 minutes at other times during construction.
  - Traffic would be managed to help ensure timely access to local residents and businesses; access delays to and from Chilnualna Falls Road and Forest Drive, the Wawona Store, the Pioneer Yosemite History Center, and shuttle bus parking near the bridge would be minimized.
  - Signing and traffic controls would be required on both sides of the river; during active construction, pedestrians and river users would not be allowed in the project area.
  - Contractors would coordinate with park staff to reduce disruption to normal park activities.
  - Equipment would not be stored along the roadway overnight without the prior approval of park staff.
  - Construction workers and supervisors would be made aware of the special sensitivity of park values, regulations, and appropriate housekeeping.

Summary of Environmental Consequences

The key impacts that could result from each alternative are summarized within table II- 1. Detailed descriptions of potential impacts are provided within Chapter IV, Environmental Consequences.

Table II-1. Summary of Environmental Consequences

Alternative 1 No Action Alternative	Alternative 2 Preferred Alternative
NATURAL RESOURCES Geology, Geohazards, and Soils	
Under Alternative 1, gradual deterioration of the bridge over the ensuing 10-year period would result in local, short- and long-term, minor, adverse impacts to soil resources. The uncontrolled collapse and the retrieval of bridge debris material would cause bank destabilization, erosion, and soil loss resulting in local, short- and long-term, moderate, adverse impacts to soil resources in the immediate vicinity of the South Fork Bridge.	Short- and long-term, negligible to minor, adverse impacts to soils are anticipated under Alternative 2 from bridge demolition, construction, and site maintenance. Alternative 2 would have a local, short- and long-term, negligible to minor, beneficial effect on soil resources due to removal of instream structures. Site restoration and stabilization would repair eroded areas and increase the protection of riverbanks, adjacent trails, and Wawona Road, resulting in a local, long-term, minor, beneficial impact on soils. Alternative 2 would result in local, long-term, minor, beneficial impacts with respect to geologic hazards due to updated seismic engineering design standards.
The past, present, and future projects in the South Fork Merced River corridor, considered cumulatively with Alternative 1 would result in local, short- and long-term, moderate, adverse impacts to soil resources.	Alternative 2 and the cumulative projects would result in a local, short- and long-term, minor, beneficial impact to soil resources. Alternative 2 would avoid the more extensive adverse effects of bank erosion compared to Alternative 1.
Hydrology, Water Quality, and Floodplains	
Under Alternative 1, gradual deterioration of the South Fork Bridge would result in continuing local, short-term, minor, adverse impacts to hydrologic processes. Alternative 1 would have local, short-term, moderate to major, adverse impacts on hydrologic processes and water quality due to the catastrophic collapse of the South Fork Bridge and subsequent sewerline rupture and debris retrieval activities. Over the long term, the collapsed bridge would be removed and a more natural river hydrology would be restored in this area, which would have a local, long-term, minor, beneficial impact on hydrologic processes.	Alternative 2 would have local, short- and long-term, negligible to minor, beneficial impacts on hydrologic processes and water quality. These effects would occur from avoidance of most bank erosion and localized flooding associated with catastrophic bridge collapse, reduced sedimentation, and controlled removal of the bridge compared to Alternative 1.
The past, present, and future projects in the South Fork Merced River corridor, considered cumulatively with Alternative 1, would have a local, long-term, minor beneficial effect on hydrologic processes and water quality.	The past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor, considered cumulatively with Alternative 2, could have a local, long-term, minor, beneficial impact on hydrologic processes. The beneficial impacts associated with Alternative 2 would nominally contribute to overall beneficial cumulative impacts on hydrologic processes and water quality.
Wetlands	
Alternative 1 would result in local, short- and long-term, negligible adverse impacts to wetland and aquatic habitat and riverine resources in the immediate vicinity of the South Fork Bridge due to the gradual deterioration of the structure. Under Alternative 1, catastrophic failure of the bridge would have local, short- and long-term, minor to moderate, adverse impacts to wetland resources due to sewage release and retrieval of bridge debris.	Alternative 2 would result in a site-specific, short-term, negligible to minor, adverse effect on wetland resources within the South Fork Merced River low flow channel. Alternative 2 would also result in a site-specific, long-term, negligible to minor, beneficial effect on aquatic, riparian, and other riverine resources that provide habitat for a diversity of river-related species. The extent and quality of wetland, riparian, aquatic, and other riverine habitats throughout the remainder of this river reach would be unaffected.
Cumulative actions would have a local, long-term, minor, beneficial cumulative effect on wetlands within the South Fork Merced River corridor due to resource protection and management. Cumulative actions have had a local, long-term, moderate, adverse cumulative effect on wetlands within the South Fork Merced River corridor due to historic development. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net local, long-term, minor to moderate, adverse effect on wetland patterns.	Cumulative actions would have a local, long-term, negligible to minor, beneficial effect on wetlands within the South Fork Merced River corridor. Thus past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net local, long-term, negligible to minor, beneficial effect on wetland patterns.

Alternative 1 **No Action Alternative**	**Alternative 2** **Preferred Alternative**
Biotic Communities - Vegetation	
Alternative 1 would result in local, short- and long-term, negligible to minor, adverse impacts to vegetation in the immediate vicinity of South Fork Bridge as a result of erosion and uncontrolled release of debris.. Debris removal following an uncontrolled bridge collapse would result in a local, short-term, negligible to minor, adverse impact to vegetation.	Alternative 2 would result in a site-specific, long-term negligible to minor, beneficial effect on vegetation, including aquatic, wetland, riparian and upland types that provide habitat for a diversity of river-related species from removal of the South Fork Bridge and revegetation. Short-term impacts would be site-specific, minor to moderate, and adverse due to disturbance of vegetation during demolition/construction activities. The extent and quality of vegetation, including aquatic, wetland, riparian and upland types, and other riverine habitats throughout the remainder of the South Fork Merced River corridor would be unaffected.
Cumulative actions would have a local, long-term, minor, beneficial, cumulative effect on vegetation resources within the South Fork Merced River corridor due to resource protection and management. Cumulative impacts have had a local, long-term, moderate, adverse, cumulative effect on vegetation resources within the South Fork Merced River corridor due to historic development. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net long-term, negligible to minor, beneficial effect on vegetation patterns.	Cumulative actions would have a long-term, minor, beneficial effect on vegetation within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net long-term, minor, beneficial effect on vegetation patterns within the South Fork Merced River corridor.
Biotic Communities - Wildlife	
Under Alternative 1, the uncontrolled collapse of the bridge, release of sewage, and retrieval of bridge debris would result in regional, short-term, negligible to minor, adverse effects to wildlife. Alternative 1 would result in a local, short-term, moderate, adverse impact to wildlife in the immediate vicinity of the South Fork Bridge. Long-term effects of Alternative 1 on wildlife would be local, negligible to minor, and beneficial due to the restoration of free-flowing conditions in the South Fork Merced River.	Alternative 2 would result in a site-specific, long-term, minor, beneficial effect on wildlife and habitat for a diversity of river-related species. During bridge removal and construction, local, negligible, short-term, adverse impacts are expected to occur. The extent and quality of wildlife habitats throughout the remainder of the South Fork Merced River corridor would be unaffected.
Cumulative actions would have a local, long-term, minor to moderate, beneficial, cumulative effect on wildlife within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net local, long-term, minor to moderate, beneficial effect on wildlife patterns.	Cumulative actions would have a local, long-term, minor to moderate, beneficial, cumulative effect on wildlife within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net local, long-term, minor to moderate, beneficial effect on wildlife patterns.
Biotic Communities – Special-Status Species	
Under Alternative 1, the uncontrolled collapse of the bridge, release of sewage, and retrieval of bridge debris would result in local, short-term, minor to moderate, adverse effects to aquatic special-status species downstream from the bridge due to sewage release and debris removal. Alternative 1 would result in local, short-term, moderate, adverse impacts to special-status species and aquatic habitat in the immediate vicinity of the South Fork Bridge. Long-term effects of Alternative 1 on special-status species would be local, negligible to minor, and beneficial due to the restoration of free-flowing conditions in the South Fork Merced River.	Removal of the South Fork Bridge would restore the free-flowing condition of the river and return this reach to a more natural state enhancing the biological integrity of the reach for the Wawona riffle beetle and special-status amphibians and resulting in a local, long-term, minor to moderate, beneficial effect on habitat for special-status bats, bats, birds, mammals, and plants at this location. Alternative 2 would result in site-specific, short-term, negligible, adverse, effects during bridge removal.
Cumulative actions would have a local, long-term, minor, beneficial cumulative effect on special-status species within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net local, long-term, minor, beneficial effect on the special-status species.	Cumulative actions would have a local, long-term, moderate, beneficial cumulative effect on special-status species within the South Fork Merced River corridor. Thus past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net local, long-term, moderate, beneficial effect on special-status species habitat.

Alternative 1 No Action Alternative	Alternative 2 Preferred Alternative
Air Quality	
Under Alternative 1, bridge debris removal, in response to an eventual, uncontrolled collapse of a portion of the South Fork Bridge, and traffic congestion at the temporary Bailey bridge, could result in local, short-term, negligible to minor, adverse impacts to air quality. However, the designated attainment status for PM-10 or ozone would remain unchanged. There would be no long-term effect on air quality under this alternative.	Local, short-term, negligible to minor, adverse impacts are anticipated from demolition/construction of the South Fork Bridge, as a result of demolition/construction activities (including removal of the temporary Bailey bridge) and increased congestion from vehicles slowing down to cross the temporary Bailey bridge. However, in the long-term, the project would have local, negligible to minor, beneficial impacts on air quality, as the new South Fork Bridge would alleviate some congestion, allowing vehicles to travel smoothly through the area at a higher speed.
Alternative 1 and the cumulative projects would result in local, long-term, minor, beneficial impacts on air quality near the South Fork Bridge. The localized, short-term, adverse effects associated with potential bridge debris removal activities would not offset the long-term, beneficial effects of the cumulative projects.	Considered with the adverse impacts associated with regional air quality influences, the cumulative projects would have a local, long-term, minor, beneficial effect on air quality near the South Fork Bridge. The short-term, adverse effects associated with demolition/construction activities under Alternative 2 would not offset the long-term, beneficial effects of the cumulative projects.
Soundscapes and Noise	
Bridge debris removal, in response to an eventual collapse of all or a portion of the South Fork Bridge, and traffic congestion at the temporary Bailey bridge, would result in local, short-term, negligible to moderate, adverse impacts on noise. However, over the long term, the ambient noise environment near the South Fork Bridge would be shaped largely by natural sources of sound interspersed with human-caused sources of noise.	The demolition/construction of the South Fork Bridge (including removal of the temporary Bailey bridge) is anticipated to have local, short-term, adverse impacts on the noise environment. However, Alternative 2 would have a local, short-term, negligible, beneficial effect on the ambient noise environment when compared to Alternative 1. Over the long term, the acoustical environment in the vicinity of the South Fork Bridge would be shaped largely by natural sources of sound (e.g., rushing water and wind), interspersed with human-caused sources of noise (e.g., motor vehicles, talking and yelling, and aircraft).
Alternative 1 and other cumulative actions would contribute to the local, short- and long-term, minor, adverse, cumulative effect on the noise environment near the South Fork Bridge.	Alternative 2 would contribute to the local, short- and long-term, minor, adverse cumulative effect on the noise environment near the South Fork Bridge. The local, long-term, beneficial effects of Alternative 2 on the ambient noise environment would not offset the adverse effects of past, present, and reasonably foreseeable future actions.
CULTURAL RESOURCES Archeological Resources	
There would be no change in the treatment and management of archeological resources in the South Fork Bridge project area as a result of Alternative 1. Bridge collapse and subsequent bank erosion that could occur has the potential to have a long-term, minor to moderate, adverse effect on archeological resources in the vicinity. Due to the existence of a specific site within the project area, planning and compliance actions would be performed in accordance with stipulations in the park's 1999 Programmatic Agreement. After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5), the National Park Service determined there would be no adverse effect on archeological resources in the project area.	Alternative 2 could have a local, long-term, minor, adverse impact to archeological resources due to ground-disturbing activities. Any actions would be performed in accordance with stipulations in the park's 1999 Programmatic Agreement. This impact is ranked minor at this stage is because the archeological site in the area of potential effect has been the subject of a data recovery plan implemented under the guidance of the California SHPO. After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5), the National Park Service determined there would be no adverse effect on archeological resources in the project area.
Alternative 1 and the cumulative projects within and in the vicinity of the South Fork Merced River would result in a local, long-term, negligible, beneficial impact on archeological resources due to protection and enhancement of this resource.	Alternative 2 and the cumulative projects with and in the vicinity of the South Fork Merced River could result in a local, long-term, negligible, beneficial impact on archeological resources.

Alternative 1 **No Action Alternative**	**Alternative 2** **Preferred Alternative**
Ethnographic Resources	
Debris removal would have local, short- and long-term, negligible, adverse effects to traditional plant gathering activities. Erosion and erosion-related effects would have local, long-term, negligible, adverse impacts to traditional plant gathering activities in the South Fork Bridge vicinity.	Alternative 2 would result in local, short- and long-term, negligible, adverse impacts to ethnographic resources, i.e., plant species gathered by American Indian people, in the immediate vicinity of the South Fork Bridge.
The cumulative projects in the Wawona area, in addition to Alternative 1, could result in a local, long-term, minor, adverse impact on ethnographic resources.	The cumulative projects in the South Fork Merced River corridor would result in a local, long-term, negligible to minor, adverse impact on ethnographic resources due to the disturbance of such resources. Alternative 2 would not contribute to this impact.
Cultural Landscape Resources	
There would be no change in the treatment and management of cultural landscape resources as a result of Alternative 1. After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5), the National Park Service determined there would be no adverse effect on archeological resources in the project area.	There would be no change in the treatment and management of cultural landscape resources as a result of Alternative 2. After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5), the National Park Service determined there would be no adverse effect on archeological resources in the project area.
Alternative 1 and the cumulative projects in the Wawona area would result in no change to cultural landscape resources.	The cumulative projects in the Wawona area would result in no impact on the cultural landscape resources.
SOCIAL RESOURCES Socioeconomics	
Local and regional, short-term, negligible, beneficial impacts to the socioeconomics of Wawona and/or Mariposa County are anticipated from construction workers spending money on food, lodging, gasoline, and other services, and by an influx of revenue to the construction/excavation operation selected to perform the clean-up work, as well as to the disposal/recycling facility used.	Alternative 2 would have a direct and indirect economic impact, which would result in a local and regional, short-term, negligible to minor, beneficial impact to the socioeconomics of Wawona and/or Mariposa County.
Local and regional, short- and long-term, negligible to minor, net beneficial cumulative effects to socioeconomics would be anticipated from local and regional planning efforts, as well as the identified construction projects near the South Fork Bridge.	The cumulative projects within and in the vicinity of Yosemite National Park would result in a local, long-term, negligible, beneficial impact to the regional economy, and a local, short-term, minor to moderate, beneficial impact during construction. Alternative 2 would contribute to this local, short-term, beneficial impact due to temporary spending on bridge removal/construction activity.
Transportation	
Eventual, uncontrolled collapse of the South Fork Bridge would be anticipated to result in local, short-term, negligible to minor, adverse impacts on transportation and traffic near the bridge site, including transit and tour bus operations. Should the unpaved overflow parking area be required for equipment staging in response to bridge debris removal, closure of this lot to privately owned vehicles would have a local, short-term, minor, adverse impact on parking availability.	Alternative 2 would result in local, short-term, minor, adverse impacts on transportation, including transit and tour bus services. Closure of the shuttle bus parking overflow lot to privately owned vehicles would have local, short-term, minor, adverse impacts on the availability of parking near the South Fork Bridge, as in Alternative 1. However, in the long term, the demolition/ construction of the South Fork Bridge would reduce congestion by allowing increased speed at which vehicles could cross this bridge, resulting in a local, negligible, beneficial impact to transportation.
Alternative 1 would contribute to the local, short-term, minor to moderate, cumulative, adverse effect on the transportation, traffic, and parking situation near the South Fork Bridge. Long-term effects may be minor to moderate and could be beneficial or adverse depending on the extent to which public transportation eases traffic congestion or closures in the east valley encourage more private vehicles in this area.	Alternative 2 would contribute to the local, short-term, minor, adverse cumulative effect on the transportation, traffic, and parking situation near the South Fork Bridge. Long-term effects may be minor to moderate and could be beneficial or adverse depending on the extent to which public transportation eases traffic congestion or closures in the east valley encourage more private vehicles in this area.

Alternative 1 No Action Alternative	Alternative 2 Preferred Alternative
Visitor Experience	
Under Alternative 1, short-term, local, moderate to major, adverse impacts on recreational visitor experiences could result from the potential for injuries and/or fatalities in the event of a catastrophic bridge failure; the effects of bridge failure on water quality and flows; and the visually intrusive effects of the riverbank damage, vegetation loss, and the presence of debris (or construction equipment needed to remove the debris). Temporary closure of existing trails following bridge failure and during cleanup would result in local, short-term, minor, adverse impacts to pedestrians, livestock rides, and winter users. Long-term impacts to recreation are not anticipated under this alternative.	Short-term, local, negligible to minor, adverse impacts could occur to recreation and pedestrian activities. Short-term, adverse impacts to passive activities such as sightseeing would be expected from the operation of heavy equipment to remove and construct the South Fork Bridge. There would be a long-term, local, negligible, beneficial impact on recreation in the vicinity of the South Fork Bridge from controlled demolition of the bridge and the proposed sidewalk in the new bridge design.
The cumulative effects of Alternative 1, when considered with past, present, and reasonably foreseeable future actions, are expected to be local, minor, adverse impacts in the short term as a result of the eventual, uncontrolled collapse of the South Fork Bridge. However, long-term, minor to moderate, local and regional, cumulative beneficial effects would be anticipated as a result of planning efforts for the South Fork Merced River corridor.	The cumulative effects of Alternative 2, when considered with these past, present, and reasonably foreseeable future actions, are expected to be local, minor to moderate, beneficial impacts in the long-term.
Scenic Resources	
The No Action Alternative would result in a local, short-term, minor, adverse impact to scenic resources in the vicinity of the South Fork Bridge. Prior to collapse of the bridge, the existing concrete barriers and deteriorating appearance of the bridge would continue to intrude upon the scenic character of Wawona. The ultimate removal of the South Fork Bridge under Alternative 1, due to failure, would result in a local, long-term, minor, beneficial effect to scenic resources at Wawona.	Alternative 2 would have a local, short-term, minor, beneficial impact on scenic resources, because it would avoid the effects associated with Alternative 1 (e.g., uncontrolled bridge failure including debris deposition). The long-term effects of bridge removal and replacement and removal of the temporary bridge would result in a local, long-term, minor beneficial impact to scenic resources compared to Alternative 1.
The cumulative activities within and in the vicinity of the South Fork Merced River corridor would result in a local, long-term, negligible to minor, beneficial, cumulative impact on scenic resources because of resource protection and management by park staff. Alternative 1 and the cumulative projects within and in the South Fork Merced River corridor would result in a local, long-term, negligible to minor, beneficial effect on scenic resources of the Wawona area.	Alternative 2 and the cumulative projects within and in the vicinity of the South Fork Merced River corridor would result in local, long-term, negligible to minor beneficial impacts on scenic resources. This is due to the avoidance of visually prominent debris and riverbank damage associated with Alternative 1 and the overall emphasis on natural resource protection and management in the Wawona area.
Park Operations and Facilities	
Alternative 1 could result in short-term, local, moderate to major, adverse impacts to park operations and facilities resulting from the immediate and dramatic increase in demand for park operations and emergency response staff should the South Fork Bridge collapse. Temporary disruption of utility lines carrying water, sewage, electricity, and communications functions, as a result of uncontrolled bridge collapse, could have short-term, local, moderate to major, adverse impacts to park operations and facilities supported by these utilities.	Alternative 2 would result in local, short- and long-term, moderate, beneficial impacts to park operations from eliminating safety hazards associated with pedestrian use of the condemned/closed South Fork Bridge, and substantially reducing the potential for a catastrophic bridge failure. However, local, short-term, negligible to minor, adverse impacts to park operations would be expected from park operations and emergency response staff providing project oversight. Local, short-term, negligible to moderate, adverse impacts to park operations and facilities would result due to temporary disruption of utility lines carrying water, sewage, electricity, and communications functions.
The past, present, and reasonably foreseeable future actions would have local minor to moderate, adverse, cumulative impacts, when considered with Alternative 1, because of increased demand on park operations, services, and facilities in the short term. Long term, facilities and operational improvements will result in a moderate, beneficial impact, however, ever increasing visitor use and aging of the facilities will eventually negate the beneficial impacts.	The past, present, and reasonably foreseeable future actions in combination with Alternative 2, would have local, minor to moderate, adverse cumulative impacts because of the increased demand on park operations, services, and facilities in the short and long term. The moderate, beneficial effects of Alternative 2 would not offset the adverse effects associated with the cumulative projects. Cumulative actions would have a long-term, moderate, beneficial impact, but this would eventually be negated by increased visitor use and aging.

Chapter III: Affected Environment

Introduction

This chapter presents topics included in the analysis of the *South Fork Merced River Bridge Replacement Environmental Assessment* and provides a rationale for inclusion. Topics were selected based on federal law, regulations, and executive orders; *NPS Management Policies*; and concerns expressed by citizens, park staff, or other agencies during scoping and comment periods. Topics dismissed from further analysis and the rationale for dismissal are also provided herein.

Impact Topics Considered in this Assessment

Natural Resources

The federal Endangered Species Acts (and associated legislation), Clean Water Act, Clean Air Act, and the National Environmental Protection Act require that the effects of any federal undertaking on natural resources be examined. In addition, the *NPS Management Policies* and natural resource management guidelines require the consideration of natural resources in planning proposals. Important natural resources, including special- status species, are present near the Wawona developed area and could be affected by implementation of the alternatives.

Analysis was performed for the following natural resource topics:

- Geology, Geologic Hazards, and Soils
- Hydrology, Floodplains, and Water Quality
- Wetlands
- Biotic Communities (Vegetation, Wildlife, and Special- Status Species)
- Air Quality
- Soundscapes and Noise

Cultural Resources

The National Historic Preservation Act, Archeological Resources Protection Act, Native American Graves Protection and Repatriation Act, and National Environmental Protection Act require that the effects of any federal undertaking on cultural resources be examined. In addition, *NPS Management Policies* and cultural resource management guidelines require the consideration of cultural resources in planning proposals. Ethnographic resources are present in the form of mature plants subject to gathering by American Indian people. The South Fork Bridge is a historic resource located within the boundaries of both the Wawona Cultural Landscape and the Wawona Archeological District. However, the bridge is not eligible for inclusion in the National Register of Historic Places, nor is it a contributing element to the cultural landscape due to its compromised architectural integrity. The bridge was originally sided with massive log stringers and fitted with a wooden guardrail giving it the appearance of a rustic log structure. These elements, however, have been removed and the bridge has little left to distinguish it from other highway bridges.

Analysis was performed for the following cultural resource topics:

- Archeological Resources
- Ethnographic Resources
- Cultural Landscape Resources, including Historic Sites and Structures

Social Resources

Social resources analyses examine the effects of the South Fork Merced River Bridge Replacement Project on the social environment in the Wawona area. Scenic resources of the park represent a major component of the visitor experience. Conserving the scenery is an important component of the National Park Service 1916 Organic Act and the enabling legislation for the park. Yosemite National Park stewardship requires consideration of two integrated purposes: (1) to preserve Yosemite's unique natural and cultural resources and scenic beauty; and (2) to make these resources available to visitors for study, enjoyment, and recreation. Implementation of the South Fork Merced River Bridge Replacement Project has the potential to affect the type and quality of recreation in the immediate vicinity of the bridge near Wawona. The project could affect park operations and facilities such as the utility lines mounted on the bridge.

Analysis was performed for the following social resource topics:

- Socioeconomics
- Transportation
- Visitor Experience
- Scenic Resources
- Park Operations and Facilities

Impact Topics Dismissed from Further Analysis

Natural Resources

The following natural resource topics were dismissed from analysis:

- Lightscapes – In accordance with *NPS Management Policies*, the National Park Service strives to preserve natural ambient landscapes representing natural resources and values that exist in the absence of human- caused light. Lightscapes would not be affected by the bridge replacement and removal activities; therefore, this topic was dismissed from detailed analysis.
- Wilderness Values – Yosemite National Park adjoins designated wilderness on U.S. Forest Service lands (i.e., Ansel Adams Wilderness, Hoover Wilderness, and Emigrant Wilderness). The South Fork Merced River Bridge Replacement Project is in the Wawona developed area and is located well away from all areas designated as Wilderness. The Wild and Scenic River impact topic is being discussed under another section of this environmental assessment; therefore, wilderness values was dismissed from detailed analysis.

- Prime and Unique Farmlands – Prime or unique farmland is defined as soil that particularly produces general crops such as common foods, forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables, and nuts. Because there are no prime or unique farmlands associated with the project site, prime and unique farmlands were dismissed from detailed analysis.

Cultural Resources

The following cultural resource topic was dismissed:

- Indian Trust Resources – Secretarial Order 3175 requires that any anticipated impacts to Indian trust resources from a proposed project or action by Department of Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes. There are no Indian trust resources in Yosemite National Park. Therefore, Indian trust resources was dismissed as an impact topic.

Social Resources

The following social resource topics were dismissed:

- Land Use – Land use in the project area would not be affected by the proposed project. This area is and would remain a vital part of the transportation corridor; therefore, this topic was dismissed from further analysis.
- Environmental Justice – Executive Order 12898 (*General Actions to Address Environmental Justice in Minority Populations and Low- Income Populations*) requires all agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low- income populations or communities. No alternative would have health or environmental effects on minorities or low- income populations or communities as defined in the U.S. Environmental Protection Agency Draft Environment Justice Guidance (USEPA 1996). Environmental Justice was, therefore, dismissed from detailed analysis.

Regional Setting

Yosemite National Park encompasses approximately 761,266 acres along the western slope of the Sierra Nevada range. This mountain range is the highest and most continuous in California, extending over 450 miles north- to- south and averaging approximately 100- miles wide. Elevations within the park range from approximately 2,000 to 13,114 feet.

The regional climate is temperate, with hot, dry summers and cold, wet winters. Approximately 85% of annual precipitation falls between November and April, either as rain at lower elevations or snow at higher elevations.

Two major river basins are located within the park, the Merced and the Tuolumne. The Merced River flows from the headwaters in the high elevations of the Sierra Nevada, through Yosemite Valley, and down to the San Joaquin Valley, where it contributes to the San Joaquin River. The

Merced River contains separate and unique watersheds, sustains separate hydrologic and aquatic resources, and supports differing levels of development. The main stem of the Merced River drains approximately 250,000 acres from the headwaters within the park to the Foresta Bridge in the El Portal area. The main stem of the Merced River flows a total of 140 miles from its headwaters to the confluence with the San Joaquin River. The South Fork drains the southern portion of the park, an area of approximately 76,000 acres. The Toulumne River drains the northern portion of the park, an area of approximately 435,000 acres. During 1987, the Wild and Scenic Rivers Act was amended to include 122 miles of both the main stem and the South Fork Merced River as Wild and Scenic (NPS 2001).

The South Fork Merced River originates at an elevation of 10,500 feet at the drainage divide with the Merced Peak Fork and flows westward, joining the Merced River 43 miles from its headwaters, west of El Portal, on land administered by the U.S. Forest Service (USGS 1992). Headwaters for the South Fork are in the vicinity of Triple Divide Peak where flows are westerly over granitic bedrock to Wawona.

The historic average annual flow of the South Fork Merced River, at its confluence with the Merced River, is 356- cfs, the minimum recorded flow was 2.2- cfs, and the maximum recorded flow was 46,500- cfs (USGS 1989). A 100- year flow volume of 13,563- cfs has been estimated through the South Fork Bridge cross- section (NPS 2000b). The average annual discharge of the South Fork Merced River is approximately 250,000 acre- feet (NPS 1978).

The major vegetation zones of the Sierra Nevada ecosystem form readily apparent, large- scale, north- south elevational bands along the axis of the mountain range. Major east- west watersheds that dissect the Sierra Nevada with steep canyons form a secondary pattern of vegetation. On the west side, forest types change with increasing elevation, from ponderosa pine to mixed conifer to firs. Straddling the crest of the Sierra Nevada is a zone of subalpine and alpine vegetation. Fire suppression, in concert with changing land- use practices, has dramatically changed natural fire regimes of the Sierra Nevada, altering ecological structures and functions in the Sierra Nevada plant communities (UC Davis 1996a,b,c,d).

Aquatic and riparian systems are the most altered and impaired habitats of the Sierra Nevada. Dams and diversions throughout most of the Sierra Nevada have altered streamflow patterns and water temperatures. Foothill areas below about 3,300 feet appear to have the greatest loss of riparian vegetation of any region in the Sierra Nevada (UC Davis 1996a,b,c,d).

Recreational opportunities abound in Yosemite National Park in developed and wilderness areas alike; however, the types and quality of activities vary considerably between these two areas. Recreational opportunities are made more memorable because of the natural beauty of Yosemite Valley, El Portal, and wilderness environments. These areas offer a wide range of recreational experiences for the visitor, including hiking, picnicking, camping, climbing, skiing, fishing, photography, swimming, nature study, livestock use, bicycling, sightseeing, and rafting. The availability of one or more of these opportunities varies by location.

The four basic categories of park operations are: resources management, facility management, visitor protection, and interpretive services. Park infrastructure and facilities include wilderness trails, roads, bridges and tunnels, campgrounds and lodging, and utilities. National Park Service management policies require that all facilities be managed, operated, and maintained to minimize energy consumption of nonrenewable fuels. The policies also require that new energy- efficient technologies be used where appropriate and cost effective.

Project Site Setting

The project site encompasses approximately 0.22 mile of the South Fork Merced River floodplain in Wawona. Wawona consists of National Park Service and privately owned land; most of the private land lies within Section 35. Site elevations range from approximately 4,020 feet in the river bottom, approximately 4,033 feet at the northern project terminus, and approximately 4,047 feet at the southern project terminus. The riverbanks, which consist predominantly of constructed rock walls with some riprap, are approximately 25- feet high, vertical on the southern bank, and steeply sloped on the northern bank.

Average annual precipitation for the Wawona area is approximately 44 inches; however, the upstream reaches of the South Fork Merced River basin receive an average of 50 to 60 inches per year (NPS 2000b). Precipitation in Wawona is predominantly rainfall; however, some winter snowfall does occur.

The South Fork Merced River drains approximately 76,000 acres within the park boundary and approximately 63,000 acres of watershed drains through Wawona. The average mean streamflow at the South Fork Bridge site is approximately 174- cfs and the flood- stage discharge can reach approximately 25,000- cfs. Upstream from Wawona, tributaries to the South Fork enter a steep-walled canyon or glacial gorge, emerging into the large floodplain meadow or deep alluvial valley of the Wawona area (NPS 2000b). Alluvial processes were altered historically due to development related to bridge placement and road construction along streambanks. The South Fork Merced River floodplain within the project site may also be affected by water diversion conducted under the *Wawona Water Conservation Plan* (NPS 1987b), which includes provisions for reduction and/or cessation of withdrawals when streamflow drops to critical levels.

Natural Resources

Geology, Geohazards, and Soils

Geology and Geologic History

Yosemite Valley, Yosemite National Park, and the surrounding Sierra Nevada are well known for their granitic bedrock formations; however, the term *granitic* has been loosely applied to the plutonic (igneous) rocks of the Sierra Nevada batholith and actually represents rock types including diorite, granodiorite, tonalite, and granite of Cretaceous age (100 to 65 million years ago) (Huber 1989).

The Sierra Nevada batholith is comprised of numerous individual rock bodies that were formed from many episodes of magmatic intrusions within the earth's crust. Approximately 70 million years ago the earth's crust overlying the plutonic intrusions eroded and the Sierra Nevada batholith became exposed at the earth's surface. Roughly 50 million years ago, the granitic bedrock had become eroded and formed gentle rolling hills with a topographic relief of little more than a few thousand feet. Water bodies shaping the Sierra Nevada at this time included the slow- moving Merced River. From approximately 10 to 5 million years ago the Sierra Nevada continued to rise in elevation, causing an increase in slope gradient and correspondingly, a higher energy Merced River. By approximately 3 million years ago the Merced River had carved a canyon in the current Yosemite Valley area as much as 3,000- feet deep (Huber 1989).

Three well- documented glacial events have occurred in the Sierra Nevada, all of which have impacted the geomorphology of Yosemite National Park. The most significant and first glacial event may have lasted as long as 300,000 years and ended approximately one million years ago. Glaciation of this time period is classified as Sherwin- age and is credited with shaping Yosemite Valley. Evidence suggests that the valley was filled to its rim by a glacier during this episode that may have extended as far westward as the community of El Portal. Subsequent glacial events consisted of the Tahoe and Tioga glaciations, which likely occurred about 130,000 and 20,000 years ago, respectively; however, neither event generated glaciers as significant, in lateral extent or depth, as the Sherwin- age glacier. Based upon glacial evidence in the Sierra Nevada, the Tahoe-age glacier probably extended farther west and was of greater thickness than the Tioga- age glacier of Yosemite Valley; however, the actual extent is unknown. The Tioga- age glacier only extended as far west as Bridalveil Meadow, as evidenced by a low ridge crossing the valley in this area, which is considered the glacier's terminal moraine. Damming caused by this terminal moraine created prehistoric Lake Yosemite, which eventually filled with sediment and formed the current flat Yosemite Valley floor (Huber 1989).

Project Area Geology

The geology in the vicinity of the South Fork Bridge area has not been studied as extensively as Yosemite Valley; however, the geologic forces that created Yosemite Valley were regional and likely influenced the creation of the South Fork Merced River corridor as well. Accordingly, the South Fork Bridge area is underlain by Sierra Nevada batholith granitics and localized alluvium. A generalized geologic map of Yosemite National Park (Huber and others, in press) shows the underlying bedrock in the vicinity of Wawona and to the east to consist of the "Fine Gold Intrusive Suite" and "Intrusive Suite of Yosemite Valley." Correlation between this and other geologic maps of the area indicate these bedrock types to be comprised of coarse- grained granites and granodiorites (Huber 1989). Both bedrock types are igneous and relatively resistant to weathering. Among some of the oldest rocks found in the Sierra Nevada are those to the west of Wawona. These rocks are metamorphic and are remnants of ancient sedimentary and volcanic rocks that were deformed and metamorphosed, in part by the granitic intrusions (Huber 1989). These metamorphic rocks are less resistant to erosion than the granitics of the Sierra Nevada batholith.

Alluvium of the South Fork Bridge area are comprised of sand, cobbles, and boulders, which is indicative of a relatively high- energy stream environment. Upstream from Wawona, the South Fork Merced River corridor is approximately 11- miles long, situated predominately in an east-west direction, and is relatively straight and symmetrical, which suggests glacial influences. Downstream from Wawona, the South Fork Merced River corridor turns in a northwest direction to its confluence with the Merced River (20 miles downstream) and takes on a more sinuous V- shape characteristic of valleys formed by rivers in more erosive bedrock.

Geologic Hazards

The South Fork Merced River flows through geologically active areas characteristic of the Sierra Nevada, where geologic and hydrologic forces continue to shape the landform. Geologic hazards associated with these forces, such as ground shaking and rockfalls, present potentially harmful conditions to visitors, personnel, and facilities in Yosemite National Park.

Faulting and Seismicity

The Sierra Nevada range in the vicinity of Yosemite National Park is not considered an area of particularly high seismic activity. South Fork Bridge lies in Seismic Zone 3, as defined by the Uniform Building Code Seismic Zone Map (UBC 1997). Throughout recorded history, most earthquakes of Richter magnitude 5 or above have been centered in the eastern Sierra Nevada or in the southern and western portions of California. A relatively small number of earthquakes over magnitude 5, but many earthquakes under magnitude 5, have been generated in the Sierra Nevada batholith. No active or potentially active faults have been identified in the mountain region of Yosemite National Park (CDMG 1994a); therefore, the risk of fault rupture or surface displacement beneath the South Fork Bridge is negligible.

Yosemite can undergo seismic shaking (ground shaking) associated with earthquakes on fault zones on the east and west margins of the Sierra Nevada (CDMG 1994b). Active fault zones in the vicinity of Yosemite include the Bear Mountains fault zone, Sierra Nevada fault zone (including Mono Lake and Hartley Springs faults), seismically and volcanically active areas of the Mono Craters- Long Valley Caldera (including Hilton Creek fault), and various faults within the Owens Valley fault zone (USGS 2002a) (see figures III- 2 and III- 3).

The active Rescue Lineament- Bear Mountains fault extends in a north- south direction within the western foothills of the Sierra Nevada, approximately 60 miles west of Yosemite Valley (USGS 2002a). The Mono Lake Fault is approximately 35 miles northeast of Yosemite Valley and lies along the northern border of the Mono Craters- Long Valley Caldera region (CDMG 1996). Over the last 12 years, the Mono Craters- Long Valley Caldera has been one of the most seismically active regions in California.

Earthquakes have been attributed to movement on the Mono Lake fault and movement associated with resurgent volcanic activity of the Long Valley Caldera. The Mono Craters last erupted 600 years ago and are considered geologically recent. The South Fork Bridge is distant enough to avoid all but ash fall from an eruption in the Long Valley Caldera region. In October 1990, the Mono Lake Fault experienced a 5.7 Richter movement. This earthquake was felt as far west as Sacramento and the San Francisco Bay area and caused landslides and rockfalls at Tioga Pass on the Big Oak Flat Road (McNutt et al. 1991).

The Owens Valley fault, located approximately 100 miles southeast of Yosemite Valley, has experienced movement within the last 200 years, and the California Division of Mines and Geology considers this fault active (CDMG 1994a). The most notable earthquake recorded in Yosemite National Park was the Owens Valley earthquake of March 26, 1872, which is estimated to have had a Richter magnitude of 7.6 and was one of the largest earthquakes in U.S. history (USGS 1991). This earthquake reportedly caused damage in the Sacramento and San Joaquin Valleys and caused significant rockfalls in Yosemite Valley.

Although earthquakes that are felt by people in Yosemite National Park are relatively infrequent, they have occurred in the past and will likely occur in the future. Ground shaking can be expressed as peak acceleration due to gravity as a percent of 1 g (g is acceleration due to gravity, or 32- feet- per- second squared). The potential estimated peak horizontal accelerations produced by the various regional faults in the central California and Sierra Nevada region are relatively low and could range between 0 and 0.2 g (CDMG 1999). Most people would likely feel this range of ground shaking, but structural damage would be negligible to slight in buildings constructed according to modern building standards. Based upon the topographic setting of the South Fork Bridge, seismically induced geologic hazards affecting the bridge would likely only consist of ground shaking.

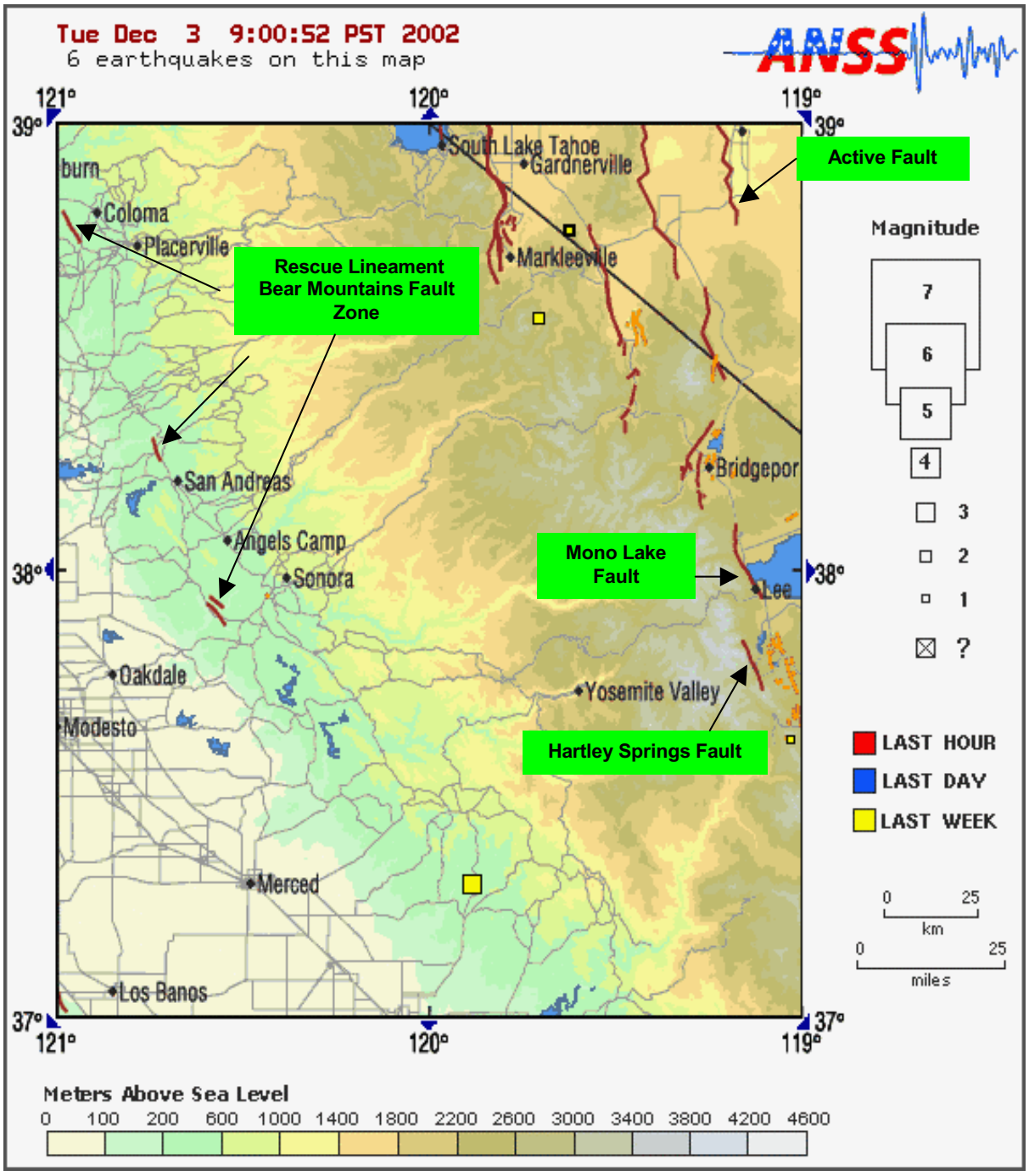


Figure III-2. Faults in the Vicinity of Yosemite National Park

Source: U.S. Geological Survey Earthquake Laterals Program <http://quake.wr.usgs.gov/recenteqs/FaultMaps/120-38.html>

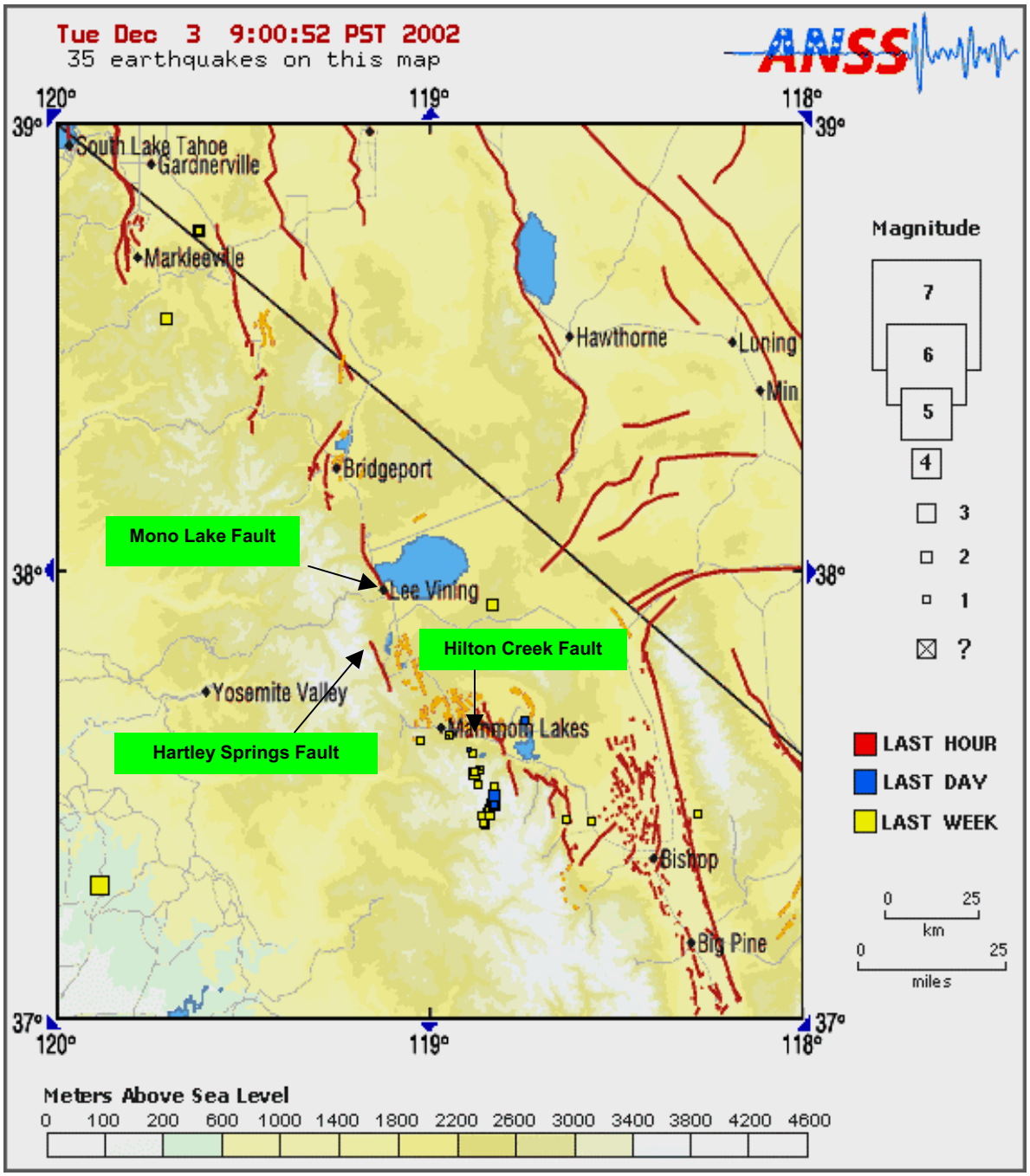


Figure III-3. Faults in the Vicinity of Yosemite National Park

Source: U.S. Geological Survey Earthquake Laterals Program <http://quake.wr.usgs.gov/recenteqs/Maps/119-38.html>

Rockfalls

Rockfall is used as a generic term to refer to all slope movement processes, including rockfall, rockslide, debris slide, debris flow, debris slump, and earth slump. Rocks have become dislodged and fallen off the sheer granite cliffs throughout the geologic history of Yosemite. Rockfalls can displace large volumes of rock and can occur due to such processes as the climate- related expansion and contraction of rock, seismic shaking, or exfoliation.

Most rockfalls are associated with triggering events such as earthquakes, rainstorms, or periods of warming that produce a rapid melting of snow. The magnitude and proximity of the earthquake, intensity and duration of the rainfall, the thickness of the snow- pack, and the pattern of warming, all influence the triggering of rockfalls. However, some rockfalls occur without a direct correlation to an obvious event and are probably associated with gradual stress release and exfoliation of the granitic rocks (USGS 1998).

More than 400 rockfalls have been recorded within Yosemite National Park; some have resulted in injury and, on occasion, death. Rockfalls can also damage or destroy roads, trails, and buildings. Two types of areas of potential rockfall impact have been identified in Yosemite Valley. The first is the area closest to the Valley or canyon walls and is called the talus zone. The second area, referred to as the rockfall shadow zone, extends out from the talus zone and is the area in which rocks may travel out from the talus.

The frequency and magnitude of rockfall events vary considerably. Many small rockfalls may occur every year and go unnoticed, while larger rockfalls occur much less frequently (USGS 1998). The National Park Service, in cooperation with the U.S. Geological Survey, is currently identifying potential geologic hazards in developed areas, including areas most susceptible to rockfalls (USGS 1998). The National Park Service is revising its management policies regarding geologic hazards, with the intent to better protect park visitors and staff by avoiding placement of structures in areas with a high potential for rockfall impact. The vicinity of the South Fork Bridge does not have steep slopes or exposed bedrock surfaces and is not considered to be in an area of rockfall hazards.

Soils

Soils form as a result of the combined effect of several factors, including mineral composition of geologic parent material (bedrock), climate, biologic activity, topographic position/relief, and time. Within the park, topography is the most important factor contributing to soil differentiation. Topography influences surface runoff, groundwater, the distribution of stony soils, and the separation of various- aged alluvial soils (NPS 1980). More than 50 soil types are found within the park; general or local variations depend upon glacial history, microclimatic differences, and the ongoing influences of weathering and stream erosion/deposition.

Soils of the Yosemite National Park region are primarily derived from underlying granitic bedrock and are of similar chemical and mineralogical composition. Various areas have meadow soils consisting of accumulated clays, silts, and organic debris that are subjected to occasional flooding. Colluvial soils have developed along the edges of cliffs where landslides and rockslides have occurred and are composed of various- sized rocks that have high rates of infiltration and permeability. Weathering processes break down talus to smaller- sized particles that are then transported by water and eventually become deposited in alluvial fans or in stream channels. Soils that formed in old river channels consist of alluvial boulders, cobbles, river wash, and loamy sands. These soils have, for the most part, moderate to severe development limitations and thus require the implementation of engineering and mitigation measures.

Six major soil types have been identified for the Wawona area. These soil types consist primarily of residual soils on slopes and alluvial soils on the valley floor. Soil depths vary from 2 to 4 feet in thickness and are moderately to strongly acidic. Soil type classifications are based upon the soil texture and the type of rock fragments contained therein. Table III- 1 lists the soil limitations as they apply to the South Fork Merced River Bridge Replacement Project.

Table III-1. Wawona Land-Use Limitations Based On Soil Type

Soil Type	Roads	Structures
Soboba stony loamy sand	Slight	Severe
Kimmerling silt loam	Severe	Moderate
Calpine sandy loam	Moderate	Moderate
Musick sandy loam	Severe	Moderate
Chaix coarse sandy loam	Severe	Moderate
Stump springs coarse sandy loam	Severe	Moderate

Source: National Park Service, Yosemite Valley Plan 2000b.

Most soils of the Yosemite vicinity have a generally undeveloped profile, indicating their relatively recent origin and young geologic age. The Natural Resources Conservation Service soil survey for Yosemite National Park is in the preliminary stage of development.

Hydrology, Floodplains, and Water Quality

Hydrologic Setting

There are a variety of surface water features in the park, several of which are major attractions for visitors. Yosemite Valley boasts some of the tallest waterfalls in the world, including Yosemite Falls and Ribbon Fall with total drops of 2,425 feet and 1,612 feet, respectively. The Tuolumne and Merced River systems originate along the crest of the Sierra Nevada in the park and have carved river canyons 3,000- to 4,000- feet deep. The Tuolumne River drains the entire northern portion of the park, an area of approximately 680- square miles. The Merced River begins in the park's southern peaks, primarily the Cathedral and Clark Ranges, and drains an area of approximately 511- square miles. Hydrologic processes, including glaciation, flooding, and fluvial geomorphic response, have been fundamental in creating landforms in the park.

The main stem of the Merced River flows from the crest of the Sierra Nevada and through Yosemite Valley, down to the San Joaquin Valley. The upper watershed is entirely within the boundaries of the park. Principal tributaries of the Merced River in Yosemite Valley include Tenaya Creek, Yosemite Creek, and Bridalveil Creek. Historic discharge in the river, measured at the Pohono Bridge gauging station in west Yosemite Valley, has ranged from a high of about 25,000- cfs to a low of less than 10- cfs, with a mean daily discharge of about 600 cfs.

South Fork Merced River Watershed

The South Fork Merced River watershed is located on the western slope of the Sierra Nevada range along the southern boundary of Yosemite National Park. The entire watershed encompasses 241- square miles, with elevations ranging from 1,410 feet at its confluence with the main stem of the Merced River, approximately seven miles west of Yosemite National Park, to

over 11,500 feet along the southeast slope of Merced Peak. The annual mean streamflow of the South Fork Merced River watershed as it reaches the main stem of the Merced River (measured at U.S. Geological Survey gauging station 11268000) is approximately 356- cfs (USGS 2002b), and the average annual total discharge is approximately 250,000 acre- feet.

The upper reaches of the South Fork Merced River display characteristics of an alpine and subalpine stream as it descends in a southwest direction from its headwaters through glaciated valleys at a gradient of about 3,400 feet over 10 miles, or an average gradient of approximately 340- feet per mile (6.4%) (USGS 1992). The South Fork Merced River turns west at about 10 miles from its headwaters and flows at a gradient of 283- feet per mile (5.3%) through the main valley toward the community of Wawona (USGS 1992). The South Fork Merced River and its floodplain is the dominant geomorphic force of the Wawona Valley. Three main tributaries (Big, Chilnualna, and Meadow Creeks) enter the river in the vicinity of Wawona. At Wawona, approximately 95- square miles comprise the South Fork Merced River watershed (FHWA 1994). The annual mean streamflow in the vicinity of Wawona (measured at U.S. Geological Survey gauging station 11267300 between 1959 and 1968) is approximately 174- cfs (USGS 2002c), and the average annual total discharge is approximately 126,000 acre- feet.

Surface water and groundwater are hydraulically connected in the Wawona area. The groundwater flows through upper unconsolidated alluvium or colluvium and underlying fractured undefined bedrock aquifers. Recharge of the shallow groundwater aquifers peaks during the spring snowmelt. Groundwater is used in Wawona for domestic water supplies where approximately 100 groundwater wells support about 260 residents and a store. The South Fork Merced River is the source for the communal water system supporting the remaining residents and all government and concessioner facilities in Wawona (USGS 1996).

The South Fork Merced River exits the park approximately five miles below Wawona and is characterized as a free- flowing river with continual white- water cascades. The canyon associated with this segment becomes sinuous as the river progresses through a V- shaped valley toward its confluence with the main stem of the Merced River (NPS 2000b).

Precipitation

The overall climate of the Yosemite area is temperate, with warm, dry summers and cool, wet winters. About 85% of the local precipitation falls between November and April. December, January, and February have the highest average precipitation, with a monthly average of 6 inches in Yosemite Valley at an elevation of 4,000 feet. The annual mean precipitation for the Wawona area, as recorded over a 30- year period, is approximately 44 inches. Snowmelt drives the peak streamflows that occur in May and June, and minimum river flow is observed in September and October.

Alluvial Processes

Yosemite National Park is comprised of and underlain by igneous granitic rock types, and weathering, erosion, and transportation of sediment is a relatively slow process. Some park valleys have significant soil layers where clays, silts, and organic debris have accumulated with the gravels and sands of the decomposed bedrock. These soils are subject to erosion and alluvial processes, including the development of meandering streambeds, floodplains, and wetlands. River impoundments such as bridges and dams tend to alter the sediment distribution and formative streamflows, thereby disrupting the natural alluvial processes. Unlike Yosemite Valley, the steeper terrain and resulting river gradient in the vicinity of Wawona have played a role in limiting the development of floodplains and wetlands. Wawona Meadow is a 200- acre, low- elevation wetland that is not directly influenced by the South Fork Merced River.

Floodplains

The floodplain plays a necessary role in the overall adjustment of a river system. It exerts an influence on the hydrology of the basin and also serves as temporary storage for sediment eroded from the watershed. Periodic flooding provides sediment and nutrients that are essential for the aquatic and vegetative health of the floodplain. Floodplains are features that are both the products of the river environment and important functional parts of the system. However, human- made structures such as bridges and buildings placed within a floodplain can impede natural flow. Discussion of flooding and floodplains is most relevant in terms of the potential loss of life and the influence on the river by development in the floodplain.

Executive Order 11988 (*Floodplain Management*) and the National Park Service *Floodplain Management Guideline* (NPS 1993b) provide guidance for the protection of life and property in conjunction with natural floodplain values in the National Park System. This guidance applies to both existing facilities and proposed facilities, and requires the National Park Service to avoid locating facilities in floodplains if alternative locations are feasible. Where no alternative exists, and with a formal statement of findings, properly mitigated facilities can be located in floodplains. The U.S. Army Corps of Engineers mapped the 100- year floodplain for Wawona in 1981. In Wawona, which is characterized by an elongated alluvial valley, the river channel can shift laterally during large floods.

The Merced River watershed has had 11 winter floods since 1916 that have caused substantial damage to property. All of these floods took place between November 1 and January 30. The largest floods occurred in 1937, 1950, 1955, and 1997, and had discharge rates in the range of 22,000- to 25,000- cfs, as measured at the Pohono Bridge gauging station in Yosemite Valley. These floods were caused by warm winter rains falling on snow at elevations up to 8,600 feet (e.g., Tuolumne Meadows), partially melting the accumulated snow pack (NPS 2000b).

Bridges rarely span the entire floodplain width of rivers and do not generally span the entire natural channel width and, therefore, constrict flow into the floodplain area. During floods, portions of the river that would normally flow into floodplain areas are forced under the structure, increasing the amount of channel discharge. The effect of these seemingly minor, flow-related changes can be profound, both upstream and downstream of the bridge. The higher discharge and reduced flow area cause a backwater effect (a deep, slow- velocity area) to form upstream and high velocities to occur near and under the bridge opening.

The existing structures at the site are currently impacting the South Fork Merced River channel and floodplain by diverting flows and increasing flow velocity during periods of high discharge. The piers and abutments of the existing South Fork Merced River bridge lie within the river channel and constrict the flow area. This constriction has resulted in the local scouring of the riverbanks downstream from the bridge and of the channel bottom at the base of the abutments and piers. In addition, the existing temporary bridge is placed at an elevation within the 50- year floodplain of the South Fork Merced River. This bridge is placed on shallow concrete spread footings and during a significant flood event there is a risk that the bridge would be washed out and collapse.

During the 1997 flooding event of the South Fork Merced River, the abutments and piers of the original bridge became partially undermined, resulting in its condemnation.

Water Quality

Water quality throughout Yosemite National Park is considered to be good and generally above state and federal standards. The state of California considers the surface water quality of most of

the park's waters to be beneficial for wildlife habitat, freshwater habitat, contact and noncontact recreation, canoeing, and rafting, as indicated in the Central Valley Regional Water Quality Control Board's *Water Quality Control Plan* (*Basin Plan*). An inventory of water quality data performed by the National Park Service indicated excellent conditions in many parts of the park, but some water quality degradation was noted in areas of high visitor use (NPS 1994a). Surface water quality of the South Fork Merced River is characterized by near excellent conditions in most areas and some water quality stresses near human development. Water quality is considered excellent at the intake for Wawona and residents use both surface and groundwater as potable water.

Water quality has been affected by the extensive and concentrated visitor use of the main stem of the Merced River in popular areas. High use of the streambank induces bank erosion through the loss of vegetative cover and soil compaction. Bank erosion can result in the widening of the river channel and loss of riparian and meadow floodplain areas. Water quality is then altered through increased suspended sediments due to erosion, higher water temperatures from a lack of riparian cover, and lower dissolved oxygen levels due to elevated temperatures and shallower river depths (NPS 2000b). In addition, studies have indicated a presence of *Giardia lamblia* and fecal coliform in various surface waters throughout the park, thereby limiting direct consumption of surface water by humans.

Nonpoint source runoff from roads and parking lots may potentially affect water quality by introducing organic chemicals and heavy metals. Areas of concentrated livestock use, including livestock trails used for concessioner- led trail rides, introduce nutrients and sediments contributed through erosion, while the developed areas introduce various pollutants associated with human waste and debris. The Wawona Golf Course presents a potential nonpoint pollution source due to the occasional use of fertilizers and pesticides (including herbicides) to maintain the golf course green, although the kinds of pesticides used and their application and disposal are strictly controlled. The Wawona Golf Course is also used as a spraying field for reclaimed water from the Wawona wastewater treatment facility.

Point sources of pollution are discharges that can be traced to a single point or location, such as a pipe or other device. Water quality impacts from wastewater may occasionally occur as a result of sewerline blockage and wastewater backup and overflow. A tertiary wastewater treatment plant serves most of the public and private sources in Wawona; the treated wastewater is augmented by surface water draws from the South Fork Merced River (up to 500,000- gallons per day in August) used to irrigate the Wawona Golf Course. During winter months, the treated wastewater is discharged into the South Fork Merced River when storage capacity is insufficient and disposal to the golf course is not feasible due to snow cover.

Wetlands

Wetland Classification and Definition

Wetlands in the project area are described using the Cowardin wetland classification system (USFWS 1979). This system classifies wetlands based on vegetative lifeform, flooding regime, and substrate material. Under this system, wetlands are defined as: "lands in transition between terrestrial and aquatic systems, where the water table is usually at or near the surface or the land is covered by shallow water." To be considered wetlands under this definition, habitats must possess one or more of the following attributes: (1) the land supports predominantly hydrophytes, at least periodically. Hydrophytes are plants that grow in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content; (2) the substrate is predominantly undrained hydric soils. Hydric soils are wet long enough to periodically produce

anaerobic conditions; and/or (3) the substrate is saturated with water or covered by shallow water at some time during the growing season of each year (USFWS 1979).

Wetlands are ecologically productive habitats that support a rich array of both plant and animal life. Wetlands sustain a variety of hydrologic and ecologic functions necessary for ecosystem integrity, including: (1) flood abatement, (2) sediment retention, (3) groundwater recharge, (4) nutrient capture and recycling, and (5) plant and animal diversity (USFS 1995). For this reason, modification of wetlands, even small areas, can induce effects that are proportionally greater than elsewhere in an ecosystem (UC Davis 1996b).

Wetland Classes

Five wetland classes (USFWS 1979; NPS 2000b) have been identified for the South Fork Merced River: (1) riverine upper perennial—main channel; (2) palustrine emergent—emergent wetland (marsh or meadow) habitat along the river, subject to various flooding regimes; (3) palustrine forest—riparian forest habitat along the river subject to various flooding regimes; (4) palustrine scrub- shrub—riparian scrub habitat, principally willow species, growing along the river subject to various flooding regimes; and (5) lacustrine limnetic—natural deep- water lakes. Two of the above- listed wetland classes occur within the South Fork Bridge site—the riverine upper perennial and the palustrine scrub- shrub classes. Additionally, a palustrine emergent wetland class is present within Angel Creek, a tributary drainage located on the edge of the southwestern project quadrant.

The South Fork Merced River channel bottom is classified as riverine upper perennial (NPS 2000b), and includes the main channel of open flowing water and the unvegetated rock and cobble substrate. This channel is approximately 110- feet wide and is armored with large cobble, gravel, and rock across the full width. River cobble and rock function to provide substrate for algae and semi- aquatic organisms within this South Fork Merced River reach. In addition, the cobble and rock function to armor the riverbed, reducing channel down- cutting and meandering. The South Fork Merced River channel would be subject to jurisdiction by the U.S. Army Corps of Engineers, under Section 404 of the Clean Water Act, as nonwetland waters of the United States.

Two sparse, palustrine scrub- shrub stands dominated by sandbar willow occupy an approximately 45- foot- wide low- flow channel along the north side of the river, and a small patch of sandbar willow is present on the west side of the bridge. The sparse stands are located east of the South Fork Bridge and continue beyond the temporary Bailey bridge. Sandbar willow shrubs dominating the sparse stands are growing from small cobble bars, are less than 5- feet tall, and provide less than 15% foliar cover. A few clumps of sedge and occasional horsetail or scouring- rush plants are associated with the sparse willow shrubs within the low- flow channel. Sparse stands of sandbar willow function to provide limited wildlife habitat structure (perches, cover for fisheries and aquatic organisms, etc.) within the river environment. The roots serve to anchor cobble and gravel and contribute to armoring the riverbed from down- cutting and meandering. Short shrubs and sedge clumps growing within flowing water and on cobble beds add to the scenic values sought by park visitors. The sparse palustrine scrub- shrub stands would be subject to jurisdiction by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act, as wetlands.

Adjacent to the southwestern project site quadrant, Angel Creek, a small tributary drainage, enters the South Fork Merced River approximately 50- feet downstream from the bridge abutment. Angel Creek forms a boundary between the project site and the golf course and is dominated by a dense palustrine emergent stand of horsetail or scouring- rush, sedge, rush, thistle, willow, cut- leaved blackberry, and blackberry. Because of its proximity to the golf course, the creek receives multiple pulses of pesticides and herbicides during the growing season. Surface

water was present in this drainage, flowing in a stream approximately 5- feet wide. The palustrine emergent wetlands of Angel Creek function to improve water quality by capturing sediments washed from the adjacent overflow parking area, provide habitat for a variety of wildlife species, recharging the groundwater table, and providing protection of the creek bottom from erosion and release of sediments to the South Fork Merced River. The shrubs and trees present along the palustrine emergent wetland margin also serve to screen or frame (depending on visitor expectations) views of the golf course from the roadway. The palustrine emergent stand along Angel Creek would be subject to jurisdiction by the U.S. Army Corps of Engineers, under Section 404 of the Clean Water Act, as wetlands.

Sparse scrub-shrub wetland

NPS Photo

Biotic Communities

Vegetation

This section provides a description of the riparian and upland plant communities associated with the South Fork Bridge site. The site has been subject to previous disturbance related to the temporary Bailey bridge installation and overflow parking activities, and historic disturbance due to construction and maintenance of the original bridge structure. As a result, some areas are devoid of vegetation, i.e., covered with asphaltic concrete (access road to and across the Bailey bridge) or consist of soil and small gravel (overflow parking areas), or are only sparsely vegetated. Additional vegetation information, including in- depth descriptions of plant communities, distribution, habitat requirements, community sensitivities, and species list by association may be obtained from the *Vegetation Management Plan* (NPS 1997a). In general, the South Fork Merced River flows through lower montane and deciduous forests in the vicinity of Wawona (NPS 2000b).

Riparian Plant Communities

Narrow bands of mixed palustrine forest and lower montane tree species occupy the riverbanks adjacent to the bridge abutments. These stands consist of ponderosa pine, white alder, and incense- cedar in the overstory. To the east of the temporary bridge, on the north riverbank, Douglas- fir and California black oak trees are also present in the palustrine forest community. Understory shrubs and sapling trees observed in the palustrine forest community include California coffee- berry, incense- cedar, and ponderosa pine. Species of understory forbs observed within this community included bedstraw and horsetail or scouring rush. The non-native cut- leaved blackberry was observed trailing along the rock wall of the southern riverbank.

Riparian trees immediately adjacent to the existing bridge abutments are approximately 40 to 60 feet in height and are typically less than 18- inches in diameter at breast height. National Park Service (2000a) states that California black oak may have been the dominant floodplain tree of the South Fork Merced River historically; however, fire suppression has resulted in present- day ponderosa pine dominance and incense- cedar understory dominance.

Riparian habitat adjacent to South Fork Bridge

NPS Photo

On the upper bank of Angel Creek, at the edge of the overflow parking area, a small stand of very large ponderosa pine and incense- cedar trees are present. These trees exceed 70- inches diameter at breast height. Adjacent to the temporary bridge, the bases of a ponderosa pine tree (approximately 50- inches basal diameter) and a white alder with three main trunks (approximately 16- inches basal diameter each) are present; removed to allow proper installation of and safe travel (sight distance) on the temporary bridge structure.

Upland Plant Communities

Upland vegetation of the South Fork Bridge site is relatively sparse and has been disturbed over the years, primarily by roadway maintenance, temporary bridge installation and access paving, and overflow parking. The southwestern quadrant supports no vegetation due to extensive use of this area for overflow parking as a result of visitors wishing to ride the shuttle bus that loads on a

large parking lot across the highway. The southeastern, northeastern, and northwestern project quadrants (relative to the river and highway intersection) support scattered ponderosa pine seedlings, saplings, and trees, but are mostly dominated by herbaceous species. Common herbaceous species observed growing on these three quadrants included the forbs aster, western sagewort, peppergrass, rockcress, sheep sorrel, mullein, and crane's bill, and the grasses blue wildrye, bentgrass, foxtail barley, and brome among others.

Several of the herbaceous species are non- native or have been introduced into Yosemite National Park environs and persist on disturbed roadside soils.

Wildlife

This section provides a general description of wildlife within the project site and area. Because of the South Fork Bridge location within a developed area with high levels of traffic, wildlife species using site habitats are those that are more tolerant of human presence. Coupled with heavy visitation and the relatively high number of residents in Wawona, there have been many human/wildlife conflicts. These conflicts usually include the presence of human food that is improperly stored or disposed (garbage) (NPS 2000b). Such conflicts can lead to property damage and/or threats to human safety, principally from black bears. The park has prepared a *Human/Bear Management Plan* (NPS 1997b) with the goal of restoring the natural ecology, distribution, and behavior of black bears through control of human activities.

The National Park Service (2000a) listed wildlife species common to montane riparian and ponderosa pine habitats as the Pacific tree frog, western fence lizard, sharp- tailed snake, western rattlesnake, red- tailed hawk, American kestrel, acorn woodpecker, warbling vireo, western screech and long- eared owls, belted kingfisher, cliff and violet- green swallows, black phoebe, song sparrow, brush rabbit, mountain beaver, mountain pocket gopher, deer mouse, striped skunk, coyote, and black bear.

The South Fork Merced River fishery is composed of introduced brook, rainbow, and brown trout (NPS 2000b). There is less angler pressure on the South Fork Merced River overall than on the Merced River main stem due to difficulty of access and terrain (NPS 2000b). Aquatic habitat under the South Fork Bridge is predominantly riffles, although a small pool has formed in the scour hole adjacent to the northernmost pier.

Special-Status Wildlife Species

The federal Endangered Species Act of 1973, as amended, requires all federal agencies to consult with the U.S. Fish and Wildlife Service prior to taking actions that could jeopardize the continued existence of species that are listed or proposed to be listed as threatened or endangered, or could result in the destruction or adverse modification of critical or proposed critical habitat. The first need in the consultation process is to obtain a list of protected species from the U.S. Fish and Wildlife Service, which was accomplished October 2, 2002, for this project (USFWS 2002).

The Council on Environmental Quality Regulations for Implementing the National Environmental Policy Act (Section 1508.27) also require considering whether the action may violate federal, state, or local law or requirements imposed for the protection of the environment. For this reason, species listed under the California Endangered Species Act or accorded special status (i.e., considered rare or sensitive) by the California Department of Fish and Game are included in this analysis, as are species designated as rare by the park.

South Fork Bridge Special-Status Species

Critical Habitat

Critical habitat has not been designated for any federally listed species that is known or has the potential to occur within the project area.

Species Considered

A total of 60 special- status species (55 wildlife and 5 plant species) have been considered in the assessment of the proposed project (see Appendix C). Species evaluated include federally listed threatened or endangered species; species of concern (former federal Category 2 species); state-listed threatened, endangered, and rare species; and species that are locally rare or threatened that are known to be or could be present within the planning area. The species list was generated based on data gathered from the National Park Service, U. S. Fish and Wildlife Service, and the California Natural Diversity Database (CDF&G 1999; USFWS 2002).

Special-Status Species Retained in this Analysis

Of the special- status species evaluated (Appendix C), the project area contains suitable habitat for 32 special- status plant and wildlife species. The federally threatened bald eagle and California red- legged frog (possibly extirpated from Yosemite National Park) may occur, along with the California endangered willow flycatcher, peregrine falcon, and great gray owl, the remaining wildlife and plant species are listed by the federal and/or state government as species of concern.

The species accounts presented below provide a brief overview of special- status species that have potential to occur within the project area. The remaining special- status species and determinations are described in Appendix C. Additional data and information for special- status species are included in the biological assessment for the *Yosemite Valley Plan*.

Federally Listed Threatened or Endangered Species

Bald Eagle

The bald eagle is currently listed as a federal threatened (proposed for delisting) and California endangered species. Bald eagles are transient within Yosemite National Park, including the project area, foraging seasonally over lakes, rivers, and open terrain. Sightings are rare and are most often reported for Yosemite Valley, El Portal, and Foresta. There are no bald eagle nests within the park or project area; however, a pair has successfully nested near, but outside, the park border at Cherry Lake in Stanislaus National Forest. This nesting pair forages over Lake Eleanor, which is located inside the park boundary. There is forage habitat for the bald eagle within the project area.

Bald eagles underwent steep population declines due to effects from pesticide uptake from the food chain; however, populations rebounded following the ban of DDT. Originally listed as federally endangered, the bald eagle was reclassified as threatened, and is currently under consideration for delisting.

California Red-legged Frog

The California red- legged frog is currently listed as a federal threatened and California species of concern. Recent field surveys conducted in Yosemite National Park found no California red-

legged frogs (UC Davis 1995; USGS 1997; USGS 1999b). This species probably occurred in the Yosemite Valley, El Portal, Foresta, and Wawona areas historically. The California red- legged frog prefers deep pools with dense stands of overhanging willows and an intermixed fringe of cattails (USFS 1988). Suitable habitat for this species occurs within the channel of the South Fork Merced River in the project vicinity.

Federal Species of Concern

Wawona Riffle Beetle

The Wawona riffle beetle is currently listed as a federal species of special concern. The type locality for this species is near Wawona, where it has been collected historically in 1954 and 1991 (ESA 2002). The South Fork Merced River was sampled in the vicinity of the project area (95 sites between the Wawona Campground and the impoundment near the Seventh Day Adventist Camp) for Wawona riffle beetle presence during late September of 2002 (ESA 2002). No life stage of the Wawona riffle beetle was found; however, suitable habitat for the species is present and it has been previously observed and collected in this river reach (Chandler 1954; Shepard and Barr 1991), and in the Merced River main stem (USGS 1999a; ESA 2001). It was anticipated that the Wawona riffle beetle would be observed if surveys were conducted during the summer months (June, July, August) rather than in the fall (late September) (ESA 2002).

The Wawona riffle beetle is widely distributed, having been observed in Humboldt, Mariposa, Plumas, Shasta, Tehama, Siskiyou, and Trinity Counties in California, and locations in Idaho and Oregon (ESA 2002). Observations within the park have occurred near Wawona (South Fork Merced River) and at the Pohono Bridge and El Capitan Moraine (Merced River). Habitat supporting the Wawona riffle beetle includes aquatic mosses, particularly *Platyhypnidium riparioides,* that grows on rocks and boulders in streams and rivers. Aquatic mosses were observed to be present at numerous locations scattered along the South Fork Merced River and Merced River main stem (ESA 2002). While most numerous within mats of moss, the Wawona riffle beetle has also been found clinging to submerged roots of riparian trees and Indian rhubarb (ESA 2002). Suitable habitat for this species is present within the project area; however, the Wawona riffle beetle has not been observed.

Foothill Yellow-legged Frog

The foothill yellow- legged frog is currently listed as a federal species of concern. Recent field surveys within Yosemite National Park found no foothill yellow- legged frogs (UC Davis 1995; USGS 1997). Suitable habitat for this species occurs in the Yosemite Valley, Foresta, Wawona, and El Portal. The yellow- legged frog prefers streams with at least 40% riffles and 40% cobble- sized or greater substrates (USFS 1988). Suitable habitat for this species is present in the project area; however, the foothill yellow- legged frog has not been observed.

Northwestern Pond Turtle and Southwestern Pond Turtle

The two subspecies of pond turtle are currently listed as federal species of concern. Yosemite National Park represents a zone of intergradation between these subspecies of pond turtle, where interbreeding makes them indistinguishable. Park records show sightings of this species in Yosemite Valley and at El Portal; however, suitable habitat also occurs at Wawona (NPS 2000b). This species is found in the Sierra Nevada up to 6,000 feet in elevation and prefers permanent ponds, rivers, streams, and ditches. They also require basking areas that include logs, rocks, vegetation mats, or open banks. The pond turtle species depend on upland habitats where individuals over- winter, construct nest chambers, and lay eggs. The upland areas are typically

covered by grassland or shrubby vegetation. Suitable habitat for both subspecies is present in the project area; however, they have not been observed.

Harlequin Duck

The harlequin duck is currently listed as a federal and California species of concern. A pair of harlequin ducks was observed on the Merced River within Yosemite National Park during 2000; however, no recent nesting within park boundaries has occurred and the species was presumed extirpated from the park (NPS 2003a). It is likely that harlequin ducks still breed, but rarely in California. The last known breeding pair observed within the Sierra Nevada was on the upper Mokelumne River in Amador and Calaveras Counties in the late 1970s; however, potential breeding habitat in California has yet to be adequately surveyed. Both wintering and breeding populations of the harlequin duck have declined throughout California, probably due to human disturbance along breeding streams, including damming. Harlequin ducks are considered to be at the extreme southern limit of occupied range in California, wintering in marine waters along rocky coasts from San Luis Obispo County north. They breed inland along fast- flowing, shallow rivers and streams. This species is known to have been reported historically in the Wawona area; however, there have not been recent observations.

California Spotted Owl

The California spotted owl is currently listed as a federal and California species of special concern. During surveys and inventories of distribution and abundance conducted within the park from April through August of 1988 and 1989, California spotted owls were observed or heard at 58 locations. Surveys were conducted by California Department of Fish and Game biologists and resulted in discovery of two nest trees and four locations with young California spotted owls. National Park Service wildlife staff have confirmed California spotted owl sightings near Happy Isles, Mirror Lake, Yosemite Chapel, and at the base of Cathedral Rocks in Yosemite Valley (NPS 2003a). This species is also known from observations within 1.5 miles of Wawona (NPS 1996a).

The California spotted owl has been observed from the southern Cascade Range, the entire Sierra Nevada, and in the Central Coast Ranges. Approximately 1,600 nesting pairs and territorial single California spotted owls had been documented in the Sierra Nevada through 1993 (NPS 2003a). Preferred habitat includes lower elevation (up to 7,600- feet elevation) red fir forest to lower elevation forests (3,000- to 7,000- feet elevation) dominated by ponderosa pine and species of oak. The presence of black oak in the forest canopy enhances habitat quality for this species. Roosting and nesting habitat for the California spotted owl includes large trees within dense forests having canopy closure of greater than 70%. Nests are usually constructed in tree cavities, on broken trees and snags, abandoned nests of other species, or in clumps of mistletoe. Breeding typically occurs near mid- February, eggs are laid and incubated from early April through mid-May, and fledging occurs from mid- to late- September. Suitable habitat for this species is present in the project area; however, the California spotted owl has not been observed.

American Dipper

The American dipper is currently listed as a federal species of concern. This species occupies montane streams, primarily swift- flowing, less frequently found along mountain ponds and lakes (NatureServe 2002). This species can regularly be seen on the Merced River throughout the Yosemite Valley and in El Portal (NPS 2003b).

Vaux's Swift

Vaux's swift is currently listed as a federal species of concern. It is moderately widespread in the west, with spotty distribution. This species occupies mature forests, but also forages over open country. It has occurred in mature and old- growth coniferous, hardwood, and mixed forests and riparian habitats. Suitable habitat for this species is present in the project area; however, the Vaux's swift has not been directly observed.

Olive-sided Flycatcher

The olive- sided flycatcher is currently listed as a federal species of concern. This species occupies coniferous, hardwood, and mixed forest stands, and woodlands, including riparian habitat. The primary habitat is mature, evergreen montane forest. Suitable habitat for this species is present in the project area; however, the olive- sided flycatcher has not been observed.

Black Swift

The black swift is currently listed as a federal species of concern. This species is an aerial- feeding bird that forages over forest and in open areas. It nests behind or next to waterfalls and wet cliffs. Suitable habitat for this species is present in the project area, but the black swift has not been observed.

Hermit Warbler

The hermit warbler is currently listed as a federal species of concern. This species occupies conifer and mixed conifer forests, shrublands, and woodlands. It prefers mature stands of pine and fir, with large trees and dense cover. Douglas- fir is an important tree species in the breeding habitat (NatureServe 2002). Suitable habitat for this species is present in the project area, but the hermit warbler has not been observed.

Rufous Hummingbird

The rufous hummingbird is currently listed as a federal specis of concern. This species occupies conifer forest and woodland, alpine areas, grasslands, shrublands, and orchards. It is associated with old- growth coniferous forest stands, but will breed in second- growth stands (NatureServe 2002). Suitable habitat for this species is present in the project area, but the rufous hummingbird has not been observed.

White-headed Woodpecker

The white- headed woodpecker is currently listed as a federal species of concern. This species occupies coniferous forest and woodland habitats, descending to lower elevations during the winter season. They prefer montane coniferous forest, primarily mature pine and fir (NatureServe 2002). Suitable habitat for this species is present in the project area, but the white- headed woodpecker has not been observed.

Nuttall's Woodpecker

Nuttall's woodpecker is currently listed as a federal species of concern. This species occupies hardwood forest and woodland habitats and chaparral shrublands. It prefers oak forest and woodland, chaparral, and riparian types (NatureServe 2002). Suitable habitat for this species is present in the project area, but the Nuttall's woodpecker has not been observed.

Pacific Fisher

The Pacific fisher is currently listed as a federal and California species of concern. Preferred Pacific fisher habitat occurs within the Wawona area, and in recent years, the majority of reported sightings (road- killed animals) have occurred along Wawona Road and Big Oak Flat Road near Henness Ridge and Crane Flat, respectively. The Pacific fisher prefers mixed conifer - montane hardwood forest habitat with large diameter trees and a moderate to dense canopy cover. The elevational range for the species is 4,000 to 6,000 feet. Suitable habitat for this species is present in the project area; however, the Pacific fisher has not been observed.

Pale Townsend's Big-eared Bat

The pale Townsend's big- eared bat is a federal and California species of concern. The species has not been identified for Wawona or the project area, but available habitat suggests it could be present in the area. It is a cave- dwelling species and occurs in a variety of habitats, typically shrub- steppe or forest edge (NatureServe 2002).

Pacific Western Big-eared Bat

The Pacific western big- eared bat, also known as Townsend's big- eared bat, is currently listed as a federal and California species of concern. The species was captured in mist net surveys conducted at Wawona, in close proximity to the South Fork Merced River (Pierson and Rainey 1995). In addition, this species was captured at Mirror Lake, Cook's Meadow, El Capitan Meadow, and Yosemite Creek.

The Pacific western big- eared bat is found from low desert to mid- elevation montane habitats, although it has been observed up to 10,000 feet elevation. It tends to concentrate in areas with caves or mines that are used as roosting sites. This species forages near native vegetation and feeds primarily on small moths. Although the species has been observed in the project area, available habitat suggests it could be present in the project area, and it has been observed nearby.

Spotted Bat

The spotted bat is currently listed as a federal and California species of special concern. Acoustic data collected in 1994 suggest there is a significant population of spotted bats in the Wawona area (Pierson and Rainey 1995). The species is considered to be one of the rarest mammals in North America; it is known from only about 25 sites in California (CDF&G 1990; Pierson and Rainey 1998). Although the species has not been observed in the project area, available habitat suggests it could be present and it has been observed nearby.

The spotted bat is a solitary cliff- dweller, and its distribution is closely linked to the availability of cliff roosting habitat (Pierson and Rainey 1997). It is found using a wide variety of habitats from low desert to coniferous forests. The species forages over meadows, along forest edges, or in open coniferous woodland, predominantly for moths. Although the species has not been observed in the project area, available habitat suggests it could be present in the project area, and it has been observed nearby.

Greater Western Mastiff-Bat

The greater western mastiff- bat is currently listed as a federal and California species of special concern. The greater western mastiff- bat has been captured in the Wawona area, in addition to the Yosemite Valley, Bridalveil Meadow, El Capitan Meadow, Leidig wetlands near Happy Isles, and at upland sites east of El Capitan Meadow and Sentinel Picnic Area. The Yosemite Valley has

the highest population of greater western mastiff- bats in any locality surveyed in California (Pierson and Rainey 1995). Although the species has not been observed in the project area, available habitat suggests it could be present and it has been observed nearby.

The greater western mastiff- bat is found along the west side of the Sierra Nevada at low- to mid-elevations, but has been detected up to 10,000 feet elevation. It occupies a variety of habitats from desert scrub to montane coniferous forest. The species distribution can be related to the availability of suitable roosting habitat and also the basis of significant rock features (e.g., large granite formations). The species forages in the open, and may travel up to 25 miles to reach feeding areas. It is often detected over desert washes, grasslands, or meadows, but also feeds above the forest canopy, mostly on moths. Although the species has not been observed in the project area, available habitat suggests it could be present and it has been observed nearby.

Small-footed Myotis Bat

The small- footed myotis bat is currently listed as a federal and California species of special concern. The small- footed myotis bat was captured in the Wawona area using mist netting in 1994 (Pierson and Rainey 1993, 1995). This species is considered a common bat of arid uplands in California; it is found on both the east and west sides of the Sierra Nevada.

The small- footed myotis bat occurs in a variety of habitats, primarily in relatively arid, wooded, and brushy uplands near water. The species is found from sea level to 8,800 feet in elevation. They are commonly observed foraging among trees and over open water, feeding primarily on small flying insects. Although the species has not been observed in the project area, available habitat suggests it could be present and it has been observed nearby.

Long-eared Myotis Bat

The long- eared myotis bat is currently listed as a federal and California species of special concern. The long- eared myotis bat was captured in the Wawona area using mist netting in 1993 (Pierson and Rainey 1993). Mist net surveys were also conducted at Wawona in 1994, and the long- eared myotis bat was captured on the Wawona Golf Course and along the South Fork Merced River (Pierson and Rainey 1995). This species is widespread in California, but is generally believed to be uncommon in most of its range. Although the species has not been observed in the project area, available habitat suggests it could be present and it has been observed nearby.

The long- eared myotis bat occupies nearly all shrub, woodland, and forest habitat types from sea level to 9,000 feet elevation. This species is dependent on oak trees for roosting (Pierson 2000). They forage among trees, over water, over shrubs, and prefer the riparian habitat edge. Preferred insects and arthropods include beetles, moths, flies, and spiders.

Fringed Myotis Bat

The fringed myotis bat is currently listed as a federal and California species of special concern. The fringed myotis bat is considered likely to occur in the project area, but the Wawona area was not surveyed for this species during 1993–1994 field efforts. This species was captured at Cook's Meadow and Yosemite Creek.

The fringed myotis bat is found in low desert scrub to high elevation coniferous forest habitats. They are found in the Sierra Nevada in deciduous and mixed conifer habitats to about 6,500 feet elevation. The species tends to forage over water in river corridors, and the primary diet consists of beetles. Although the species has not been observed in the project area, available habitat suggests it could be present and it has been observed nearby.

Long-legged Myotis Bat

The long- legged myotis bat is currently listed as a federal and California species of special concern. The long- legged myotis bat was not recorded during recent surveys within the park, but it is expected in the available habitats, including those found at Wawona and the project area.

The long- legged myotis bat is found in a variety of habitats in the Sierra Nevada, including shrub, woodland, and forest habitat from sea level to 9,000 feet in elevation. It is highly dependent on oak trees for roosts; however, it may also roost in mines, rock crevices, or buildings. The species forages over open areas at tree- canopy height and feeds primarily on moths.

Yuma Myotis Bat

The Yuma myotis bat is currently listed as a federal and California species of special concern. The Yuma myotis bat was captured in Wawona and along the South Fork Merced River near Wawona during recent mist- netting surveys (Pierson and Rainey 1993, 1995). It was also captured at Pate Valley, Mirror Lake, El Capitan Meadow, Yosemite Creek, and Yosemite Valley.

The Yuma myotis bat is found in a wide variety of habitats in the Sierra Nevada below 8,000 feet. The species is relatively tolerant of humans and has been observed roosting under bridges (Wildlife Society 1998). Typically, the species roosts in trees, mines, caves, rock crevices, and buildings. The species forages directly over open water surfaces and relatively still water, including ponds, pools in streams, and rivers.

California Threatened and Endangered Species

Willow Flycatcher

The willow flycatcher is listed by the state of California as an endangered species (CDF&G 1999). Two subspecies—the willow flycatcher and the little willow flycatcher—may occur within Yosemite National Park. There are recent records of willow flycatchers within the park, at Wawona Meadow, Hodgdon Meadow, and Westfall Meadow. The species formerly nested in the Yosemite Valley, but were last observed there in 1966. The entire state population of willow flycatchers is thought to number approximately 200 pairs (CDF&G 1991).

The willow flycatcher is a neotropical migrant that breeds in riparian and moist meadow willow thickets in the United States. Within California, it is a rare to locally uncommon summer resident in wet meadow and montane riparian habitats, from 2,000 to 8,000 feet in elevation. An association between meadow size and the occurrence of the willow flycatcher, i.e., they prefer larger meadows, has been determined (CDF&G 1982). Potential foraging and perching habitat for the willow flycatcher is present in the project area; however, it has not been observed.

American Peregrine Falcon

The American peregrine falcon has been removed from the threatened and endangered species status and is currently federally delisted. However, this species is listed as endangered by the state of California. There are currently three active nest sites in the Yosemite Valley and one historic nest site in the Merced River canyon. A pair appeared to be nesting on Wawona Dome during 1990, but no young were fledged, and there have been no subsequent observations of peregrine falcons at this location. Prior to 1978, there was a 37- year absence of nesting records for the American peregrine falcon in Yosemite National Park, which generally coincides with declines in numbers in the U.S. and Europe (UC Davis 1984). American peregrine falcons require vertical cliff habitat with large potholes or ledges that are inaccessible to land predators. They appear to prefer

sheer cliffs at least 150- feet high that have a large cave or overhung ledge to accommodate nestlings (Monk et al. 1988). This species forages over a variety of Sierra Nevada habitats primarily supporting populations of band- tailed pigeons, woodpeckers, and jays. Suitable foraging habitat for the American peregrine falcon is available within the project area; however, the American peregrine falcon has not been observed.

Great Gray Owl

The global range of the great gray owl reaches its farthest southern extent in the Sierra Nevada, with the total population in California estimated to be between 100 and 200 birds. Declines of great gray owls in California may be due to habitat degradation from logging, grazing, and development. Yosemite National Park has the highest concentration of this species, probably because the park contains the most intact habitat.

Preferred breeding habitat of great gray owls is pine and fir forests near montane meadows. Nests are established in the tops of large- diameter broken snags. At the latitude of Yosemite National Park, high summer temperatures are an important factor affecting nesting success, so suitable nest snags must have abundant shade. Hunting occurs in meadows, where small mammals such as voles and gophers are taken. In winter, the great gray owls descend to meadows as low as 2,000 feet in elevation.

Areas in Yosemite National Park of know great gray owl breeding include Crane Flat and meadows along Glacier Point Road. Known wintering areas include Big Meadow in Foresta and Wawona. Yosemite Valley appears to contain good wintering habitat, but observations of great gray owls in this location are rare. This may be due to the high level of human disturbance in the Valley. Suitable habitat for this species is present in the project area, but the great gray owl has not been observed.

Special-Status Vegetation

Small's Southern Clarkia

Small's southern clarkia is currently listed as a park rare species and a California species of special concern. This annual forb is endemic to California and restricted to Madera, Mariposa, and Tuolumne Counties. It is found in foothill woodlands and lower montane forests (open ponderosa pine forests) between 2,400 and 6,300 feet elevation (NatureServe 2002), and has been identified in open areas at Foresta. Suitable habitat for this species is present in the project area, but Small's southern clarkia has not been observed.

Rawson's Flaming-trumpet

Rawson's flaming- trumpet is currently listed as a California species of special concern. This species is found in California and Oregon, growing on cool, shaded substrates near streams, from 3,000 to 6,000 feet in elevation (NatureServe 2002). Suitable habitat for this species is present in the project area, but it has not been observed.

Yosemite Lewisia

The Yosemite lewisia is currently listed as a California species of concern. This species occupies lower montane coniferous forest, pinyon- juniper woodland, and upper montane coniferous forests, growing on sandy soils derived from granite (NatureServe 2002). Suitable habitat for this species is present in the project area, but the Yosemite lewisia has not been observed.

Air Quality

The primary factors that determine air quality are the locations of air pollutant sources, the types and amounts of pollutants emitted, meteorological conditions, and topographic features. Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants.

Climate and Meteorology

The state of California is divided into air basins that are defined partly by their meteorological and topographical characteristics. The South Fork Bridge is located near the boundary of two air basins: the Mountain Counties Air Basin and the San Joaquin Valley Air Basin. Figure III- 5 shows both air basins and their location in California.

The South Fork Merced River lies within the Sierra Nevada mountain range, which roughly parallels the eastern boundary of California and extends from the Cascades Range in the north to the Tehachapi Mountains in the south. Mountain climatic zones are characterized by considerable vertical wind motion and by winds and temperatures different from those in the valleys. During the warm season of the year, wind circulation in the mountain zones is generally upslope, with only brief periods of downslope winds at night. During the cold season, wind circulation in the absence of storm activity is generally downslope, with brief periods of upslope winds on south- facing slopes (NPS 2000b).

While air quality in a given basin is usually determined by emission sources within the basin, it can also be affected by pollutants transported from upwind air basins by prevailing winds (NPS 2000a). For instance, the California Environmental Protection Agency concluded that all of the ozone exceedances in 1995 (see table III- 2) in the southern portion of the Mountain Counties Air Basin (i.e., Tuolomne and Mariposa Counties) were caused by transport of ozone and ozone precursors from the San Joaquin Valley Air Basin (California Environmental Protection Agency 1996b). Air quality in the Mountain Counties Air Basin is heavily influenced by pollutant transport from the metropolitan Sacramento and the San Francisco Bay areas (NPS 2000a).

Air Quality Designation and Ambient Air Quality Standards

As designated under the Clean Air Act, air quality in Yosemite National Park is Class I, indicating the lowest allowable increments of air quality degradation (USEPA 2002). This air quality classification is aimed at protecting parks and wilderness areas from air quality degradation. The act gives federal land managers the responsibility for protecting air quality and related values from adverse air pollution impacts, including visibility, plants, animals, soils, water quality, cultural and historic structures and objects, and visitor health.

Air pollutants in the park originate primarily from populated areas outside the park boundary. However, vehicle traffic on the South Entrance Road and in visitor use areas of the Wawona area contributes to local air quality degradation. Vehicle emissions alone generally do not cause major parkwide air pollution increase, but they are of concern in the park because of incremental additions to other sources of pollution (NPS 1996a).

Figure III-5. California Air Basins

The federal Clean Air Act requires the U.S. Environmental Protection Agency to identify National Ambient Air Quality Standards (national standards) protective of public health and welfare. Currently, the U.S. Environmental Protection Agency has established national standards for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter 10 microns or less in diameter (PM- 10), particulate matter less than 2.5 microns in diameter (PM- 2.5), and lead. California has adopted more stringent standards for most of the criteria air pollutants (referred to as State Ambient Air Quality Standards, or state standards). Table III- 2 includes the national and state standards for ozone and PM- 10.

Table III- 3 shows the current attainment/nonattainment designations for the applicable subregions within the Mountain Counties and San Joaquin Valley Air Basins. As illustrated, the portion of the Mountain Counties Air Basin within Mariposa County is designated as nonattainment for state ozone and PM- 10, but is designated attainment or unclassified for the other state air quality standards and all of the federal standards. The San Joaquin Valley Air Basin is designated as nonattainment for both state and national ozone and PM- 10 standards (NPS 2000a).

Air Quality Monitoring Data

Federal, state, and local agencies operate a network of monitoring stations throughout California to provide data on ambient concentrations of air pollutants. Table III- 2 summarizes recent monitoring data from the monitoring stations in the vicinity of South Fork Bridge. Three of the stations are located in Yosemite National Park (Turtleback Dome, Wawona, and Yosemite Valley Visitor Center), and one is located outside of the park, approximately 12 miles west of Wawona, in the Sierra National Forest (Jerseydale). Wawona, Yosemite Valley Visitor Center (in Yosemite Village), and Jerseydale are approximately 4,000- feet above sea level, and Turtleback Dome is approximately 5,300- feet above sea level. As shown in table III- 2, exceedances of state and national standards for ozone and state standards for PM- 10 are recorded on occasion within the park and in the vicinity of the park (NPS 2000b).

Soundscapes and Noise

By definition, noise is human- caused sound that is considered to be unpleasant and unwanted (NPS 2000b). Whether a sound is considered unpleasant depends on the individual listening to the sound, and the activity being performed by the individual when the sound is heard (e.g., working, playing, resting, sleeping). While performing certain tasks, people expect, and therefore accept, certain sounds. For instance, if a person works in an office, sounds from printers, copiers, and typewriters are generally acceptable and not considered unpleasant or unwanted. By comparison, when resting or relaxing, these sounds are not desired. Sounds that people may desire during these times are referred to as natural quiet, a term used to refer to ambient (outdoor) natural sounds without intrusion of human- caused sounds. Natural quiet can be essential in order for some individuals to achieve a feeling of peace and solitude (NPS 2000b).

Natural sounds within Yosemite National Park and adjacent to the South Fork Merced River are not considered to be noise. These sounds result from natural sources such as waterfalls, flowing water, animals, and rustling tree leaves. Existing noise within the park results from mechanical sources such as motor vehicles, generators, and aircraft overflights, as well as from human activities such as talking and yelling (NPS 2000b).

Table III-2. Recent Ozone and PM-10 Concentration Data for Yosemite National Park and Vicinity

Pollutant	National Standard	State Standard	Monitoring Data By Year							
			1994	1995	1996	1997	1998	1999	2000	2001
Ozone Monitoring Data										
Station: Yosemite National Park – Turtleback Dome										
Highest 1-hr. avg., ppm[a]	0.12	0.09	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.10**	**0.12**	**0.11**
Days over state standard[b]			10	11	9	3	10	4	3	3
Days over national standard			0	0	0	0	0	0	0	0
Highest 8-hr. avg., ppm	0.08	N/A	**0.10**	**0.10**	**0.09**	**0.10**	**0.10**	**0.09**	**0.10**	**0.10**
Days over national standard			12	11	10	3	9	4	6	4
Station: Yosemite National Park – Wawona										
Highest 1-hr. avg., ppm[a]	0.12	0.09	**0.10**	**0.11**	**0.10**	ND	ND	ND	ND	ND
Days over state standard[b]			1	9	8					
Days over national standard			0	0	0					
Highest 8-hr. avg., ppm	0.08	N/A	**0.08**	**0.09**	**0.09**	ND	ND	ND	ND	ND
Days over national average			0	2	1					
Station: Sierra National Forest – Jerseydale (approximately 12 miles west of Wawona)										
Highest 1-hr. avg., ppm[a]	0.12	0.09	ND	**0.11**	**0.11**	**0.12**	**0.11**	**0.16**	**0.12**	**0.12**
Days over state standard[b]				16	26	7	12	13	9	3
Days over national standard				0	0	0	0	1	0	0
Highest 8-hr. avg., ppm	0.08	N/A	ND	**0.10**	**0.11**	**0.11**	**0.10**	**0.11**	**0.10**	**0.10**
Days over national standard				22	30	7	14	21	14	7
Particulate Matter (PM-10) Monitoring Data										
Station: Yosemite Village – Visitor Center										
Highest 24-hr. avg., µg/m^3[a]	150	50	**115**	**71**	**106**	**62**	40	**82**	**98**	**312**
State exceedances/samples[c]			14/60	5/56	4/46	1/56	0/56	2/55	2/73[d]	8/61[d]
National exceedances/samples			0/60	0/56	0/46	0/56	0/56	0/55	0/73	1/61
Annual geometric mean, µg/m^3	50	30	27.8	24.2	20.3	19.6	18.0	ND	ND	ND

[a] *ppm = parts per million; µg/m^3 = micrograms per cubic meter.*

[b] *"Days over standard" refers to the number of days in a given year during which the ozone concentration over at least one hour exceeded the hourly state or national standard.*

[c] *PM-10 is usually measured every sixth day (rather than continuously like other pollutants). For PM-10, "exceedances/samples" indicates the number of exceedances of the state standard that occurred in a given year and the total number of samples that were taken that year.*

[d] *The California Air Resources Board lists the number of days that a sample exceeded the state/national standard, but does not list the number of samples taken for that particular year. They do calculate an estimated number of exceedances had PM-10 samples been taken each day of the year (365 days). The number of sampling events for these years was calculated by taking the exceedances estimated for 365 days (e.g., in 2000 the estimate was 15.0 exceedances in 365 days, or 15/365) and making it equivalent to the number of actual exceedances for the number of samples (e.g., in 2000, the number of actual exceedances was two in an unknown number of sampling events, or 2/x). An equation of 15/365 = 2/x was used to determine the number of sampling events (x) in 2000. The same relationship was used to calculate the number of sampling events for 2001.*

NOTE: NA = Not applicable. ND = No data available. Values shown in bold type exceed the applicable standard.

SOURCE: National Park Service 1996a, 2000a, and California Environmental Protection Agency, Air Resources Board, "California Air Quality Data," 1995, 1996a, 1997, 2001, 2002a; California Ambient Air Quality Data 1980–1999, Data CD, Nov. 2000b.

Table III-3. Air Basin Attainment / Nonattainment Designations

Pollutant	National	State
Mountain Counties Air Basin		
Ozone[a]	Attainment[c]	Nonattainment[c]
Carbon Monoxide	Unclassified / Attainment	Unclassified[d]
Nitrogen Dioxide	Unclassified / Attainment	Attainment
Sulfur Dioxide	Unclassified	Attainment
Particulate Matter (PM-10)[b]	Unclassified	Nonattainment[d]
Lead	Not Classified	Attainment
San Joaquin Valley Air Basin		
Ozone[a]	Nonattainment	Nonattainment
Carbon Monoxide	Unclassified / Attainment	Unclassified[c]
Nitrogen Dioxide	Unclassified / Attainment	Attainment
Sulfur Dioxide	Unclassified[c]	Attainment
Particulate Matter (PM-10)[b]	Nonattainment	Nonattainment
Lead	Not Classified	Attainment

[a] *Current designations for the national ozone standard apply to the 1-hour-average standard. USEPA has not yet designated areas for the recently established national 8-hour-average ozone standard, but is likely to designate Mariposa and Madera Counties as nonattainment for the 8-hour national ozone standard based on existing monitoring data (California Environmental Protection Agency 2000a).*

[b] *Since monitoring for PM-2.5 began in 1998, air basins will not be classified with respect to the new national PM-2.5 standard until 2000 or later.*

[c] *County-specific designation. Unless otherwise noted, designations apply to the entire applicable air basin.*

[d] *Designation applies to the portion of Mariposa County that lies within Yosemite National Park.*

Source: California Environmental Protection Agency, Air Resources Board, 1998, 2000a, 2002b.

Existing Noise Sources

Motor Vehicles

The noise environment at the South Fork Bridge is primarily influenced by automobiles entering or leaving the park via Wawona Road. Automobiles on roadways leading to visitor facilities, including trails, campgrounds, the gas station and restaurant, the Pioneer Yosemite History Center, the Wawona Information Station (summer only), and the other amenities at Wawona, also contribute to the noise environment in the project area. Noise from motor vehicles is obviously loudest immediately adjacent to roadways; however, given the generally low background sound levels at the park, noise can be audible a long distance from a roadway. Atmospheric effects (e.g., wind, temperature, humidity, rain, fog, and snow) and topography (e.g., echo from canyon walls) can significantly affect the presence or absence of motor vehicle noise in various areas of the South Fork Merced River corridor.

Aircraft

As part of a report to Congress (NPS 1994b), the National Park Service conducted a visitor survey that included questions related to aircraft noise in the park. Of the visitors surveyed, 55% reported hearing aircraft at some point during their visit (NPS 2000b). The report states that recognition of noise from aircraft was highly variable from location to location. Visitor impacts were considered greater for activities where individuals were removed from automotive

transportation and areas where other visitors were present. In Yosemite, a majority of the complaints concerning aircraft noise were from wilderness trail users (NPS 2000b).

Other Sources

Other mechanical sources of noise within the park include roadway construction equipment, generators, radios, and park maintenance equipment (i.e., mowers and chainsaws). The frequency and use of these sources vary both by season and reason for use (NPS 2000b).

Background Sound/Noise Levels

Current sound levels adjacent to the South Fork Merced River vary by location and also by season (the volume of water in the rivers being lower in the fall and higher in the spring). Current noise levels are also influenced by the number of visitors to the park and by the proximity of mechanical noise sources (NPS 2000b).

Sound and noise levels are measured in units known as decibels (dB). For the purpose of this discussion, sound and noise levels are expressed in dB on the "A"- weighted scale (dBA). This scale most closely approximates the response characteristics of the human ear to low- level sound. Human beings have a wide range of hearing, from the threshold of hearing (0 dBA) to the threshold of pain (140 dBA).

In preparing the *Merced Wild and Scenic River Comprehensive Management Plan/Final Environmental Impact Statement* (NPS 2000b), sound- level measurements were obtained at various locations adjacent to the Merced and South Fork Merced Rivers (from the headwaters to the base at Vernal Falls). Measurements were obtained with a Larson Davis dosimeter (Model 700) calibrated with a Larson Davis sound- level calibrator. At each measurement location, observations of the background level were made over a period ranging from one to five minutes. In addition, observers noted the sources contributing to the background level and noted any sources that caused intrusive levels above the typical background level (NPS 2000b).

Sound levels taken in the middle of the old Wawona bridge (South Fork Bridge) measured 50 dBA, with a maximum observed level of 59 dBA near the bridge. These measurements were recorded at 10:30 A.M. on a Sunday in September 1999. Observers noted that most of the noise was associated with the use of the Wawona Store east of the roadway (i.e., people talking or yelling, buses idling, vehicle traffic noise). The maximum noise level was obtained when a truck crossed the temporary Bailey bridge at the project site (NPS 2000b).

Sensitive Receptors

Some land uses are considered more sensitive to ambient noise levels than others due to both the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities involved. Residences, motels and hotels, schools, libraries, churches, hospitals, and parks and other outdoor recreation areas are generally more sensitive to noise than commercial and industrial land uses.

Facilities located within two miles of the South Fork Bridge would be considered sensitive receptors. In the southwest project quadrant, a portion of the Wawona Golf Course would fall within this zone. Most visitor activity is within the southeast project quadrant, which supports the shuttle bus loading area, parking lots, the Wawona Store, a gas station, the covered bridge, Wawona Campground, ranger office, some private residences, and a horse camp. The Wawona Hotel complex also lies within this southeast project quadrant, but is separated from the project

site by a low ridge. In the northeast project quadrant, the principle noise receptors would include the Pioneer Yosemite History Center and the water and wastewater treatment plants. The northwest project quadrant supports a picnic area that would be considered a sensitive noise receptor.

Regulatory Standards

Generally, the federal government establishes standards for transportation- related noise sources that are closely linked to interstate commerce such as aircraft, locomotives, and trucks—for those sources, state governments are preempted from establishing more stringent standards. State governments establish noise standards for those transportation- related noise sources that are not preempted from regulation, including automobiles, light trucks, and motorcycles. Noise sources associated with industrial, commercial, and construction activities are generally subject to local control through noise- related plans and policies (NPS 2000b).

Summary

Although noise is not specifically addressed in the classification criteria for the National Wild and Scenic Rivers system, the presence of noise can reduce visitor enjoyment and degrade the immediate environment adjacent to a river. Depending on the area, noise sources adjacent to the South Fork Merced River include motor vehicles, aircraft, and human activity such as talking and yelling. Measured sound levels indicate the background (minimal) sound level near the project site is between 50 and 59 dBA (NPS 2000b).

Cultural Resources

The Wawona area includes evidence of thousands of years of human occupation. The prehistory of the Wawona area is similar to that of Yosemite Valley, which was first inhabited by people between 4,000 and 6,000 years ago; however, human occupation seems to have occurred in the Wawona area somewhat earlier than it did in Yosemite Valley. Portions of the Wawona area have been designated an archeological district eligible for listing in the National Register of Historic Places. There are at least 72 sites within the archeological district boundaries that contain either prehistoric, historic, or both ages of resources.

At approximately 9,500 years ago, there is preliminary evidence near El Portal of prehistoric utilization of the area. An Early Prehistoric use of the area (9,500–8,000 years ago) follows, which is characterized by a culture apparently focused on hunting, and plant processing to a much lesser degree. This period is followed by the oldest well- established occupation of the Merced River corridor, termed the Intermediate Prehistoric (8,000–3,200 years ago). It is represented by hundreds of archeological sites, and is indicative of a more diverse subsistence with an abundance of milling sites, in addition to and in conjunction with, lithic scatters. This period grades into a Late Prehistoric use of the area (3,200 years ago–circa AD 1800) with environmental and cultural change noted. During this time, the bow and arrow are introduced and the Mariposa Complex (identified after AD 1350), characterized by large, permanent village habitations near major streams, is archeologically recognized as predominately representing the pre- contact Sierra Miwok.

After 1800, American Indians resident to this area were the Southern and Central Sierra Miwok, some Mono Lake Paiute, and a few individuals from the disbanded missions. The Western Mono and Chukchansi Yokuts may also have traversed the upland areas of this region. Between 1848–1851, recorded accounts indicate that Euro- Americans arrived and began prospecting, hunting,

and trapping, with cultural tensions leading to the Mariposa Indian War in 1851. Although treaties were made following the war, these were not ratified by the U.S. Congress and left the American Indians landless and without rights (NPS 2000b). However, as the popularity of Yosemite Valley grew, many American Indians found employment in the valley and continued to live in the area. Today, American Indian people continue to live in and around the park, and many are locally employed.

At present, seven American Indian tribes claim traditional associations with lands of Yosemite National Park. The National Park Service has formally consulted with three tribal groups regarding the bridge replacement: the American Indian Council of Mariposa County, Inc. (the political organization representing the Southern Sierra Miwok tribe), the North Fork Mono Rancheria, and the Picayane Chukchansi. Individuals from most of the tribes represented by these organizations continue to maintain cultural associations with lands and resources in the park through traditional ceremonies, gathering of traditional plants, and other activities.

In 1833, the first Euro- American party of explorers, hunters, and trappers entered the region of the Yosemite Valley. The 1840s and early 1850s were a culturally tumultuous period during which Euro- American miners further encountered American Indian villages along the waterways of the region. In 1853, after the 1851 Mariposa Indian War, Galen Clark explored the South Fork Merced River, Wawona Meadow, and Yosemite Valley. He established Clark's Station in 1857 (a resting place for travelers) along Wawona Meadow, and in 1858 constructed a log bridge over the South Fork Merced River to facilitate wagon crossings. Several roads were established linking the station with the Mariposa Grove of Giant Sequoias and Yosemite Valley, both established as preserves in 1864.

Between 1875 and 1883, the (currently known) Wawona Hotel and area where Clarks' Station once stood were deeded to Henry Washburn who added the roof to the covered bridge upstream from the present South Fork Bridge. The period between 1885 and 1907 saw increasing interest in the area by renowned artists, dignitaries, and tourists as accessibility was expanded through the building of the Southern Pacific Railroad, with access from Merced to El Portal. Automobiles were first allowed in the park in 1914 and quickly became the dominant mode of travel through the park. Highway 41 was completed as a year- round through- route in 1933, opening routes to the Wawona area from both the north and south.

Archeological Overview and Resources

To date, approximately 6% of Yosemite National Park has been inventoried for archeological resources and over 1,100 archeological sites have been documented. Most of the inventories focus on lower elevation developed areas and road corridors; however, some wilderness areas have been surveyed. In most cases, inventories have been conducted in support of park development projects as part of the environmental and historic preservation compliance process. The most recent comprehensive overview of archeological resources and their information value is presented in *An Archeological Synthesis and Research Design for Yosemite National Park, California* (NPS 1999). This document summarizes the results of past archeological research and presents research questions and methodologies for improving understanding of prehistoric and historic lifeways in the Yosemite region.

In general, archeological sites are important for the information provided regarding prehistoric and historic lifeways. Prehistoric and historic American Indian sites are important to Indian people as a tangible link with the past. Historic archeological resources in the Wawona area are primarily associated with its development for tourism and its use as a travel corridor (the southern entrance to the park).

The Wawona area, which contains many archeological sites indicative of the substantial prehistoric and historic habitation of this area, has been one of the most intensively examined areas in Yosemite National Park. Studies have included research- driven assessments, as well as those undertaken in compliance with cultural resource laws and regulations. The latter include investigations in support of planning and development for a wastewater treatment plant in 1981, and for construction of sewage system trench lines in 1984. These projects prompted a third excavation project in the Wawona Basin. One such study reported on test and data recovery excavations at 10 sites during the 1985 and 1986 field seasons (Hull 1989). Based on these results, it was determined that a certain phase of sites, the Tamarack Phase, was located on upper terraces of the Merced River, while sites of the Mariposa and Crane Flat Phases were located on lower terraces on the riverbank.

Wawona Archeological District

The existing South Fork Bridge, and the Wawona area in general, have been the subject of archeological and historical interest for at least a century, and the focus of numerous evaluations and mitigation actions undertaken within the past few decades in compliance with federal and state cultural resource laws and regulations.

The first formal documentation and consultation occurred in 1978, when many sites in the Wawona area were nominated to the National Register of Historic Places as an archeological district because of the presence of "significant prehistoric and historic archeological resources" (Anderson and Hammack 1978). The Wawona Archeological District was determined eligible for listing in the National Register of Historic Places on December 7, 1978, based upon the presence of 72 historic, prehistoric, or multi- component sites within the district boundaries. The significance of the district lies in its ability to provide information pertaining to subsistence strategies, seasonal use of specific ecological zones, demographic patterns, and both historic Miwok and pre- Miwok occupation of the area.

Archeological Sites

One archeological resource currently designated CA- MRP- 171/H, is located within the South Fork Bridge project area. This site, which has been the subject of many years of study and interest, was originally recorded as CA- MRP- 171 and –172 (Bennyhoff 1952, 1956). As originally reported, the site consists of surface obsidian flakes and a midden (deposit of refuse, shells, etc.) area located on the north side of the river, just west of Wawona Road and the South Fork Bridge. During its original recordation, it was assessed as covering approximately 150,000- square meters (37.07 acres). Various elements of the site were recorded between 1952 and 1992, and assigned separate designations, although all are now combined under CA- MRP- 171.

Situated predominately on the north bank of the South Fork Merced River, the site, as now defined, consists of surface features including several bedrock milling stations (sites where dried fruits and nuts, such as acorns, were processed into flour by grinding with a stone or stone mortar, leaving a depression (milling stick) or hole (mortar cup) in the bedrock) containing numerous mortar cups and some milling slicks, and one, faded red- lined pictograph panel. A widespread area of obsidian flaked debris and fire- affected rock dominates the surface archeology. Artifact- bearing subsurface midden deposits are widespread and extend to depths of 230 centimeters (cm) (7.55 feet) in the northern site area (Ervin 1984); however, no features, either historic or prehistoric, have been located to date. Historic artifacts located on the surface and in subsurface contexts include small, mainly localized, surface concentrations of refuse.

This archeological site is well known and has been of interest to the professional archeological community, as well as the general public, minimally since the formation of the park. Formal

consultation between the National Park Service and the California State Historic Preservation Office regarding the eligibility of the site for inclusion in the National Register of Historic Places was initiated in 1994, in preparation for the proposed removal of the South Fork Bridge. The site, which consists of several localities indicative of historic and prehistoric utilization of the landscape, has been formally determined eligible for listing in the National Register of Historic Places as a contributing element of the Wawona Archeological District.

Between May and July 1994, the National Park Service undertook archeological investigations at CA- MRP- 171/H. Excavations were structured in two phases: testing and data recovery. Archeological methods employed and research questions addressed during these investigations are outlined in a project- specific research design (NPS 1994c) that was based in part on the theoretical direction presented in the parkwide research design (Moratto 1981), and on current research in the park and the region. The subsurface testing phase was designed to systematically determine the structure, integrity, and data potential of the archeological deposit within the context of National Register of Historic Places criteria. Based upon this evaluation, the data recovery phase focused on evaluating the cultural deposit directly within the area of potential effect for the proposed South Fork Merced River Bridge Replacement Project.

Ethnographic Overview and Resources

American Indian people continue traditional cultural associations with parklands and resources, including plant- gathering areas, spiritual places, places that are prominent in oral traditions, and historic village locations. Also of importance is the protection of ancestral burial areas. Little formal research has been conducted to inventory and document significant traditional resources; however, one study has been conducted in the Yosemite Valley. Only incidental information exists for the Wawona area; very little ethnographic resource information has been documented for wilderness areas adjacent to the Wawona area. A parkwide Ethnographic Overview was prepared during the 1970s, but has not been revised with current information. Some ethnohistory studies that were focused on the Yosemite Valley and El Portal were conducted, as were cultural affiliation studies focused in both the northern and southern segments of the park. A cultural affiliation study is currently underway to identify places, tribal groups, and families associated with the Wawona area. Parkwide archeological evidence indicates that for more than 3,000 years, American Indians practiced localized harvesting, pruning, irrigation, and vegetation thinning (NPS 2000b).

One study identified and documented cultural and natural resources associated with American Indian occupation and use of the Yosemite Valley (Bibby 1994). As a result of these and other studies and consultations, at least 104 sites, features, and plant species have been identified as having been and/or are currently used by American Indians. Forty- seven sites were either historic villages or features, 16 sites have mythic or ceremonial value, 27 sites are food and water sources, 20 sites have plants used in making baskets or other utilitarian objects, and four sites contained medicinal plants. The most important plants identified for ethnographic purposes were California black oak stands and individual trees, willows, grasses, sedges, rush, mosses, and mushrooms. Features were included and consisted of bedrock mortars, human habitation areas, sites with traditional and contemporary spiritual value, gravesites, and areas used for resource gathering and food processing.

The National Park Service consults with American Indians concerning management of park lands, especially with regard to undertakings and park resources of concern, including:

- Access to park areas
- Gathering of plant materials for food, medicinal, and utilitarian purposes
- Protection of historic lifeways

The National Park Service is required to consult on the basis of government- to- government relations with federally recognized American Indian tribes, and on an information basis with non- federally recognized tribes. The National Park Service has also: (1) entered into an agreement with the American Indian Council of Mariposa County, Inc., for purposes of traditional practices and the establishment of an Indian Cultural Center at the site of the last historic village in the Yosemite Valley (west of Camp 4); and (2) worked with park- affiliated American Indian groups to develop a plan consistent with the Native American Graves Protection and Repatriation Act to address inadvertent discoveries of human remains, burial objects, sacred objects, and objects of cultural patrimony. The Southern Sierra Miwok have the closest cultural ties to lands and resources in Wawona, although the North Fork Mono and Chukchansi Yokuts also have some association with these lands and resources.

Cultural Landscape Overview and Resources (Including Historic Sites and Structures)

Comprehensive inventories and evaluations of historic sites, structures, and cultural landscape resources have been undertaken within Yosemite National Park. According to Director's Order–28: *Cultural Resources Management Guidelines* (NPS 1991), a cultural landscape is:

> …A reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials, such as roads, buildings, walls, and vegetation, and by use reflecting cultural values and traditions.

Cultural landscapes are the result of the long interaction between humans and the land, and the influence of human beliefs and actions over time on the landscape. Shaped through time by historical land- use and management practices as well as politics, property laws, technology, and economic conditions, cultural landscapes provide a living record of an area's past. Cultural landscapes are continually reconfigured and are, therefore, a good source of information for specific time periods as well as being reflective of long- term use, thus presenting a preservation challenge. Yosemite National Park and the Wawona area of the South Fork Merced River corridor contain nationally significant historic resources such as designed landscapes and developed areas, historic buildings, and circulation systems (trails, roads, and bridges) that provide visitor access.

A cultural landscape study of the Wawona area, focusing on Washburn Company holdings, has been undertaken and is reported in the *Merced Wild and Scenic River Comprehensive Management Plan/ Final Environmental Impact Statement*. The lands historically associated with the Wawona Hotel are bisected by Wawona Road, which runs southeast to northwest through the area. A cultural landscape study completed in 2000 identifies three major components of the interrelated landscape: the Wawona Hotel area (and golf course), the Pioneer Yosemite History Center, and the Day Use/Service Area (Historical Research Associates 2000).

Wawona Hotel Area (and Golf Course)

The focal point for the Wawona Hotel area landscape is the Wawona Hotel complex, a National Historic Landmark, located approximately 1,300 meters (4,265 feet) east of the South Fork Bridge. The hotel was listed in the National Register of Historic Places in 1975, and with associated structures, constitutes the core of the developed area of Wawona.

The Wawona Hotel was constructed in 1875, but was destroyed by fire and reconstructed in 1878. This Victorian hotel complex provides lodging and amenities for park guests and continues to serve in that capacity today. Six other principal buildings, comprising the core complex, are located on a knoll overlooking the Wawona Meadow. The hotel complex was designated a National Historic Landmark in 1987 due to its architectural features and its historical associations with early California commerce and landscape painter Thomas Hill. Four additional historic buildings, all associated with hotel operations, are located outside of the main complex. Three are near the hotel on the north side, while a fourth—the slaughterhouse—is isolated from the others within a stand of trees at the north end of the Wawona Meadow.

Historic Wawona Hotel

NPS Photo

The Wawona Golf Course, in operation since 1918, occupies a large portion of the Wawona Hotel property south of Wawona Road. Constructed within the north end of Wawona Meadow, the golf course represents the closest feature of the hotel area landscape component to the South Fork Bridge, extending to within 100 meters (328 feet) to the south.

The hotel resort complex once encompassed other facilities that still are part of the cultural landscape, such as the Wawona Covered Bridge and neighboring structures that have been converted to historical and interpretive uses, as well as properties that exist today as archeological or landscape features (e.g., historic ditches such as the Washburn Ditch that once provided all of the domestic water for the operation of the hotel, foundations, dumps, pastures, fences, and orchards). Also included is the first wagon road into Wawona, the Chowchilla Mountain Road, originally constructed in the late 1800s to link Wawona with the Mariposa area. Galen Clark's home, located adjacent to the Wawona Golf Course, may exist as an archeological resource. The area may also include remnants of cavalry action that are historically significant. Also extant in the Wawona developed area are several Civilian Conservation Corps structures, such as the National Park Service Maintenance Complex and ranger office and three residences constructed immediately after the Wawona land purchase in 1932. These structures and features constitute the two remaining components of the Wawona Cultural Landscape.

Pioneer Yosemite History Center

The Pioneer Yosemite History Center, located on the banks of the South Fork Merced River approximately 320 meters (1,050 feet) east of the proposed project, includes a collection of structures relocated from other areas of the park assembled to interpret the history of the area. The Wawona Covered Bridge typically provides access to the center from the Wawona Hotel

complex; however, the bridge is currently undergoing rehabilitation due to damage from flooding.

Public Service/Day Use Area

The South Fork Bridge is nearest the most recently added component of the Wawona Cultural Landscape. This is the public service/day use area, consisting of a variety of buildings that provide services to Yosemite National Park visitors. This area is located immediately northwest of the main hotel building complex, and extends to the banks of the South Fork Merced River. This area is located north of Wawona Road, between the Wawona Hotel and the Pioneer Yosemite History Center. Forest Drive physically separates this landscape area from the project site.

This area provides guest services such as a gas and service station, a small store (now commonly referred to as the Wawona Store), a picnic area, and a comfort station. A parking area serves this collection of buildings and also provides parking for the Pioneer Yosemite History Center landscape component, located on the north side of the river. Although the exact date of construction of the Wawona Store is unknown, it was present in 1954. Two other structures are located north of Forest Drive, one west of the trail to the Wawona Covered Bridge and one on the east end of the public parking area.

South Fork Bridge

The South Fork Bridge was originally constructed as a rustic style structure characterized by massive log stringers and a wooden guardrail that gave the bridge the appearance of log construction. This type of construction was applied to other bridges of the 1920s and 1930s. It was built to replace the historic Wawona Covered Bridge as the main crossing for Wawona Road (HAER No. CA- 113).

The South Fork Bridge (located within the boundaries of the Wawona Archeological District) is not eligible for the National Register of Historic Places due to lack of architectural integrity. This determination was made during consultation between the park and the California State Historic Preservation Office, and was due to the changes and rehabilitation to the bridge over the years. These changes were made due to the effects of high flows during flood events (CDHP 1996). This bridge is a noncontributing element to the Wawona cultural landscape evaluated during 2000, although it does reside within the cultural landscape boundaries.

In June 1995, the National Park Service, Denver Service Center, requested a formal determination of the eligibility of the South Fork Bridge for listing in the National Register of Historic Places (NPS 1995). The request was prompted by a National Park Service proposal to replace the bridge due to structural and safety issues. The formal consultation was necessary because the bridge was over 50 years old and, therefore, considered a historic resource. In a letter to the California State Historic Preservation Office, the National Park Service (1995), cites a Historic Resource Study undertaken in 1987 by Linda Wedel Greene that evaluated the historical significance and integrity of the South Fork Bridge and assessed its eligibility for listing in the National Register of Historic Places (NPS 1995). This study (NPS 1987) recommended that the historic bridge structure was not eligible for listing due to damage and reconstructions (since its original construction in 1931) that had compromised its architectural and historic integrity.

It was also noted that in 1993, Harlan Unrau of the National Park Service, Denver Service Center, concurred with this finding, stating that the South Fork Bridge "does not display the same outstanding rustic architectural design as the eight bridges in Yosemite Valley listed on the National Register of Historic Places as a group in 1977" (NPS 1995). The California State Historic Preservation Office concurred with the findings of the park that the bridge is not eligible for

inclusion in the National Register of Historic Places, further stating that "the structure has no strong associations with historic events or persons, nor is it architecturally significant" (COHP 1995).

In a final consultation letter for the South Fork Bridge, the California State Historic Preservation Office acknowledged that the bridge was determined, "through formal consultation on July 24, 1995, between the National Park Service and the California State Historic Preservation Office, to be ineligible for the National Register of Historic Places" (COHP 1996). This letter was written in response to the receipt of a 1996 environmental assessment for the proposed bridge removal and replacement from the Federal Highway Administration.

In 1991, the bridge was documented to HAER standards, which included historical and descriptive data, measured drawings, and archival photographs (HAER No. CA- 113). This effort was part of the Yosemite National Park Roads and Bridges Recording Project.

Following removal of the timber trim, the sides of the bridge were encased in plain reinforced concrete and the wooden guardrail was replaced with an aluminum one. Although bridge reports provide no reason for the rail's replacement, it was likely necessary to meet current American Association of State Highway Transportation Officials standards (HAER No. CA- 113). The HAER documentation reiterates that the removal of the distinctive, decorative timber trim is an important change that contributes to the bridge's lack of architectural integrity, as it now has "little left to distinguish it from other highway bridges" (HAER No. CA- 113). In accordance with the protocols agreed upon by Yosemite National Park and the California State Historic Preservation Office on March 20, 1997, the current level of documentation for the South Fork Bridge was determined sufficient.

Social Resources

Socioeconomics

Approximately 3.5 million people visited Yosemite National Park in 2002 (NPS 2003c). Yosemite visitors spend millions of dollars on lodging, meals, transportation, and other goods and services, both inside the park and in gateway communities outside the park. As a result, park visitor spending is an important source of income and employment for the park, the primary park concessioner, and the gateway communities.

The South Fork Bridge is located near Wawona in Mariposa County, along Wawona Road near the park's south entrance, a primary entrance to the park for concession suppliers, visitors, local residents and businesses, and staff (NPS 1996a). The population of Mariposa County was approximately 17,130 in year 2000 (U.S. Census Bureau 2002) and is projected to reach 28,625 by 2040 (NPS 2000b). Recreation and tourism (including arts, entertainment, recreation, accommodations, food services, and other services) are the major industries in Mariposa County, providing 31.2% of employment. Major recreation areas in the county, aside from Yosemite National Park, include Stanislaus National Forest and Sierra National Forest, and the U.S. Forest Service/Bureau of Land Management managed recreation areas along the Merced River. Other recreation resources in Mariposa County include Lake McSwain and Lake McClure, which provide camping opportunities (NPS 2000b). Construction- related activities (including residential and commercial builders; general contractors; highway and street construction; other heavy construction; special trade contractors; plumbing, heating, and air conditioning contractors; painting and wall covering contractors; masonry, drywall, insulation, tile, and stone contractors; carpentry contractors; and concrete contractors) provide 9.1% of employment in the county (U.S. Census Bureau 2000, 2002).

There are approximately 50 National Park Service housing units, 62 concessions housing units, and 302 private housing units located in Wawona. Concessions facilities in Wawona include the 104- room Wawona Hotel complex, which features a dining room, bar, golf course, pro shop, and snack bar. Other concessions facilities include a grocery store, gift shop, service station, and stable. During the peak season, approximately 200 National Park Service and concession staff reside in Wawona (NPS 2003a). Commuting time between Wawona and Yosemite Valley is approximately 50 minutes. Heavy visitor traffic on the south entrance road during the summer and snow during the winter can increase commute times. The commute from Wawona to Fish Camp is about 15 minutes, to Sugar Pine is 20 minutes, and to Oakhurst is 30 minutes, under good conditions (NPS 2003a).

Transportation

State highways leading into Yosemite National Park (Highways 41, 120, and 140) transition at the entrance stations into an internal, parkwide system of roughly 200 miles of road (figure I- 1). The state of California has no rights- of- way through the park and, therefore, there are no state highways within the park; however, state highway numbers are used on park signs to help orient visitors (NPS 2000b). Additional transportation facilities within the park consist of a series of spur roads, access drives, pedestrian trails, bike paths, and parking areas accessed from the main roads.

On an average summer (August) day in 1998, approximately 7,365 vehicles entered the park and primarily consisted of park visitors and employees. Vehicle entries are generally evenly spread among the entrance stations. During peak- season months, the South Entrance Station (Wawona Road/ Highway 41) accommodated the highest percentage of entries (29%), while the Tioga Pass Entrance (Tioga Road/Highway 120 East) received 25% of entries, the Big Oak Flat Entrance (Big Oak Flat Road/Highway 120 West) received 24%, and the Arch Rock Entrance (El Portal Road/Highway 140) provided access for 22% (NPS 2000b).

The temporary Bailey bridge has replaced the condemned South Fork Bridge in the project area and carries traffic on Highway 41 over the South Fork Merced River. Wawona Road is approximately 27- miles long and is the principal access to the towns of Wawona and Mariposa Grove, Badger Pass Ski Area, Glacier Point, and Yosemite Valley. It is maintained for year- round access. Throughout its length, the 24- foot- wide road was constructed over mountainous terrain with steep grades and it is surrounded by moderate to dense forest. Average daily traffic volumes entering the South Entrance Station in August 1998, were approximately 2,120 vehicles. The temporary Bailey bridge is vulnerable to flooding and washouts and may not always be accessible (NPS 2000b).

Traffic Conditions

The number of vehicles using park roads has increased over the years, but traffic volumes generally do not exceed road capacity. This is consistent along the South Fork Merced River where Wawona Road crosses and then follows the river. Travelers encounter minor to moderate congestion on the busiest summer days (NPS 2000b).

Transit and Tour Bus Services

From spring through fall, a free shuttle bus service operates between Wawona and Mariposa Grove. During the summer, VIA Adventures, operating out of Merced, California, provides regional service through Wawona, operating buses from Merced to the park. A variety of park tours by Yosemite Transportation System is available for visitors choosing to explore the park by

means other than private vehicles. In summer, daily trips from Yosemite Valley include a hiker's bus to Glacier Point and one to Tuolumne Meadows, as well as a tour bus to Wawona that stops at the Mariposa Grove of Giant Sequoias (NPS 2000b).

Parking Facilities

Parking in the project area is provided in Wawona for visitors and employees associated with facilities such as the Wawona Hotel, the Wawona Store and gift shop, the Pioneer Yosemite History Center, a campground, and two picnic areas. Also, visitors riding the free shuttle bus to the Mariposa Grove of Giant Sequoias are encouraged to park in Wawona. Parking demand varies during the day, and from day to day, as the number of visitors and employees fluctuates (NPS 2000b).

Visitor Experience

Yosemite National Park is guided by the National Park Service enabling legislation, which has two purposes: (1) to preserve the unique natural resources and scenic beauty at the park; and (2) to make these resources available to visitors for study, enjoyment, and recreation. The experience of visitors in Yosemite National Park is dependent on a number of factors, including the availability of recreational and interpretive opportunities, the availability of services, and the quality of the recreational environment and facilities. In general, there are two sometimes overlapping groups of visitors: those who visit the developed or frontcountry areas of the park (including Yosemite Valley and Wawona) and El Portal, and those that visit the designated wilderness at the park (NPS 2000b). Visitation has grown substantially in recent years to nearly 3.5 million visitors annually in 2002 (NPS 2003c), a steady increase from two million visitors annually two decades ago. Each visitor is expecting an individual experience while entering an increasingly crowded environment.

Approaching Yosemite Valley along Wawona Road by way of the South Entrance, visitors are afforded views from above the Merced River gorge and have the opportunity to stop at Tunnel View to experience this world- famous and historical viewpoint into Yosemite Valley. From Tunnel View, trees in the Valley hide roads, and little evidence of human influence is evident. Tunnel View also offers a spectacular panorama, including Bridalveil Fall and El Capitan in the foreground, and the granite domes and cliffs of the east valley in the background (NPS 2000b).

In Wawona, observations show that visitors tend not to circulate through the area as much as in Yosemite Valley, though no formal data have been collected. Overnight visitors to Wawona stay in the Wawona Hotel, in private lodgings, or at Wawona Campground. Most visitors access the Wawona area in private vehicles. A free shuttle bus operates seasonally, carrying visitors from the Wawona Store to the Mariposa Grove of Giant Sequoias (NPS 2000b).

Recreation

Camping along the South Fork Merced River is available at Wawona Campground year round. Other recreational activities available in Wawona and along the South Fork Merced River near the project site include hiking, picnicking, cross- country skiing, fishing, photography, swimming/ wading, nature study, livestock use, sightseeing, rafting, interpretation programs, and golfing. Day hiking opportunities are available in Wawona and near the project site. Some trails parallel or lead to destinations along the river; a trail loops around Wawona Meadow; and several trails lead to the wilderness, the Mariposa Grove of Giant Sequoias, and other popular day- hiking destinations (NPS 2000b). In Wawona, the picnic tables near the Pioneer Yosemite History Center and Wawona Campground are heavily used by park visitors.

Most cross- country ski routes in the Wawona area follow summer trails or traverse open meadows. At the 4,000- foot elevation, Wawona sometimes has little or no snow for long periods, and snow at lower elevations is rare. Some cross- country skiing may take place on Wawona Meadow and the golf course. The temporary Bailey bridge and Wawona Road provide visitors entering from the south access to the Badger Pass downhill and cross- country ski area. On the South Fork Merced River, most fishing takes place downstream of the water intake and impoundment area of the water treatment facility, primarily for introduced brown and rainbow trout. Along the South Fork Merced River, swimming is common in the vicinity of Swinging Bridge, near Wawona Campground, and the picnic area east of the campground (NPS 2000b).

Both commercial and private livestock uses are currently found in Wawona. Livestock boarding is available in Wawona at the concessioner's stable, and a horse camp is available. Except where posted, all designated trails are open to livestock and are maintained to accommodate livestock traffic. The primary concessioner offers various livestock trips from Wawona, including a two-hour ride, a half- day trip, and a full- day trip. These rides offer an opportunity for visitors with mobility impairments to experience the wilderness (NPS 2000b). Limited rafting occurs on the South Fork Merced River between Swinging Bridge and Wawona Campground. In this reach, the river is relatively flat. Rafting regulations have been implemented to protect river habitat and provide for visitor safety. The presence of large woody debris in the channel may pose a potential risk to rafters, and park and concession staff attempt to warn visitors engaged in rafting activities of this hazard (NPS 2000b).

Golf is available in Wawona at the historic Wawona Golf Course (established in 1918). The length of time the course is open varies year by year, depending on weather conditions, but it is open June through October most years. Golf course use ranges from 1,100 to 3,400 visitors per month (NPS 2000b).

Scenic Resources

The South Fork Bridge is located near the southern park boundary in an area known for its cultural amenities and recreational resources, in addition to providing pleasant views of the surrounding landscape. In terms of landscape features, the South Fork Merced River, the river corridor (particularly downstream views), Wawona Dome, and intervening forested hills and slopes provide a pleasant scenic vista for visitors. From the South Fork Bridge, visitors have access to the landscape views described above and may also observe the Wawona Golf Course, Wawona Store, the historic Covered Bridge, and the Pioneer Yosemite History Center exhibits. Within a short walk south of the bridge, the historic Wawona Hotel is visible from Wawona Road.

In general, the scenery of Yosemite National Park is one of its most significant resources and is largely responsible for its enormous popularity. A visual analysis has been completed for Yosemite Valley, and was based on scenic viewing potential. Based on the analysis, locations within the valley were classified as A- Scenic (viewpoints most commonly selected by eminent photographers or painters), B- Scenic (points less commonly selected), or C- Scenic (areas of minor scenic quality). If this classification were applied to areas outside of Yosemite Valley, the river reach containing the South Fork Bridge would likely be classified as C- scenic, because it can accept visual intrusion without detracting from either primary or secondary vistas, due to the development that already exists at this site.

The South Fork Merced River contributes substantially to the area scenic value. The banks are lined with riparian trees and shrubs; boulders, rocks, and cobble; and logs and other woody debris, which adds to its rugged character. During the spring, the river changes from that of small riffles and runs within the cobble bed to a bank- full watercourse supporting eddys, runs, and minor waves with white- caps.

The Wawona area provides pleasant views of Wawona Dome, the South Fork Merced River, and the surrounding hills and slopes. There is a scenic interface of river, rock, and forest throughout this narrow valley. To the east of the bridge, views include the developed historic landscape of Wawona.

The existing South Fork Bridge structure, with its rock and masonry piers and wingwalls, fits comfortably within the Wawona landscape (even though altered significantly for rehabilitation during the 1960s). The temporary Bailey bridge that has been in place since 1998 represents a visual intrusion for the Wawona area because of its overall height, rectangular shape, and the shiny silver finish of the galvanized steel lattice. The proposed South Fork Bridge would incorporate a natural river cobble façade around all railings and along the interior walls and a formliner façade emulating natural material and style on the abutments and exterior approach walls.

Downriver view from South Fork Bridge

NPS Photo

Wawona Store looking from the South Fork Bridge

NPS Photo

Park Operations and Facilities

Park facilities and infrastructure in the vicinity of South Fork Bridge include the categories of roads and bridges, visitor facilities, and utilities. The road segment encompassing this proposed project (approximately 0.22 mile) lies predominantly between Chilnualna Falls Road to the north and Forest Drive to the south. Approximately 200- feet upriver, the historic Covered Bridge (listed on the National Register of Historic Places) provides pedestrian access to the Pioneer

Yosemite History Center. One service road, with a small bridge constructed over Angel Creek, is present in the southwestern project quadrant and provides access to the pump station used to pressurize irrigation lines for reclaimed water distribution on the Wawona Golf Course. The southeastern project quadrant supports Forest Road and another access road for the filling station, Wawona Store, and the shuttle bus parking area.

Several visitor facilities are present near the South Fork Bridge site, they include: (1) the Wawona Golf Course and the earthen parking area in the vicinity of the southwestern project quadrant; (2) the Wawona Hotel, gas station, store, gift shop, and parking area for shuttle buses in the vicinity of the southeastern project quadrant; (3) Wawona Campground and picnic area in the vicinity of the northwestern project quadrant; and (4) the Covered Bridge, Pioneer Yosemite History Center, ranger office, Wawona District Materials Storage Area, and the wastewater treatment plant in the vicinity of the northeastern project quadrant. Approximately one- third of the visitors to the park drive to Wawona and cross the South Fork Merced River at the bridge site.

Utility lines are attached to the South Fork Bridge and provide water, sewage, electricity, and communications functions. A 10- inch reclaimed waterline with a defuser has been attached to the downriver side of the bridge. This line carries reclaimed tertiary- treated gray water from the water treatment plant to the pump station for Wawona Golf Course. An 8- inch gravity sewerline has been attached to the upriver side of the bridge. This line carries sewage from the Wawona Hotel, primarily, to the wastewater treatment plant. Attached underneath the bridge structure are a 4- inch high voltage electrical line conduit, telecommunications lines, and alarm systems. The telecommunications lines provide telephone service and Internet access to the Wawona Hotel, and the electrical line services the pump station. All of these utilities will require transfer to the temporary bridge prior to removal and replacement of the South Fork Bridge. Because of its height, a lift station will be required to maintain the flow of sewage in the gravity sewerline.

Park operations and facility staff representing both the Facilities Management and Resources Management divisions would oversee the contract work necessary to complete the South Fork Merced River Bridge Replacement Project. Facilities Management staff conduct preventative and corrective maintenance on park infrastructure, including water, wastewater, and electric utility systems, park roads, trails, and structures. Resources Management staff protect the natural, historic, and cultural resources of the park. They are responsible for resource monitoring and evaluation, impact mitigation, restoration, and wildlife management (NPS 2000b).

Chapter IV: Environmental Consequences

Introduction

This chapter describes the probable consequences (or impacts) that could result under the alternatives described in this environmental assessment. The chapter is divided into three parts. The Introduction describes the methodologies and assumptions that are common to all resource topic areas. The Methodologies and Assumptions section presents the methods used to assess impacts for each specific resource topic. The next section describes the impacts anticipated under each alternative, organized by resource topic. Environmental impacts are summarized in Table II- 1: Summary of Environmental Consequences, located at the end of Chapter II, Alternatives, of this document.

Impact Analysis

Each alternative contains an impact analysis for each individual resource topic. Impacts are evaluated based on context, duration, intensity and whether they are direct, indirect, or cumulative. In addition, impairment to park resources and values is considered.

The following guidelines were used to identify the context, duration, intensity (or magnitude) and type of impact.

- **Context.** The context considers whether the impact would be local or regional. For the purposes of this analysis, local impacts would be those that occur within the immediate vicinity of the South Fork Merced River Bridge Replacement Project, unless otherwise noted.
- **Duration.** The duration of an impact is noted as either short term or long term and defined in a range of years.
- **Intensity.** Indicators of the intensity of an impact, whether it is negligible, minor, moderate, or major, are included in the impact analysis and specifically defined by topic area in the methodology section that follows.
- **Type.** The type of impact refers to whether the effect is considered beneficial or adverse. Beneficial impacts would improve resource conditions. Adverse impacts would deplete or negatively alter resources. Mitigating actions listed in Chapter II would be taken during implementation of the action alternatives. With the exception of the cultural resource analysis, all impacts have been assessed under the assumption that mitigating measures have already been implemented.

Alternative 1 (the No Action Alternative) describes the status quo. This alternative provides a baseline from which to compare other action alternatives, to evaluate the magnitude of proposed changes, and to measure the environmental affects of these changes.

Cumulative Impacts

The Council on Environmental Quality describes a cumulative impact as follows (Regulation 1508.7):

> *A cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably*

> *foreseeable future actions regardless of what agency (federal or non- federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time*.

To determine potential cumulative impacts for this environmental assessment, projects within the South Fork Merced River and Wawona area were identified. The cumulative projects identified included past actions, and planning and development activities currently under implementation or planned for implementation in the reasonably foreseeable future. Appendix D contains the list of cumulative projects included in the cumulative impacts analysis. These actions are evaluated in the impact analysis in conjunction with the impacts of an alternative to determine if they have any additive effects on a particular natural, cultural, or social resource. When a cumulative project was in the planning stage, the evaluation of cumulative impacts was based on a general description of the project.

Projects and plans that were considered in the cumulative analysis were: (1) the Merced River Plan, which protects and enhances the Outstandingly Remarkable Values and free- flowing condition of the river; (2) South Entrance/Mariposa Grove Site Planning, which considers alternatives for restoring giant sequoia habitat; (3) Wilderness Boundary Protection Land Exchange, Seventh Day Adventist Camp, Wawona, which involves a land exchange to protect wilderness; (4) Wawona Campground Improvement, which would rehabilitate the existing campground and construct an additional campground; (5) South Fork and Merced Wild and Scenic River Implementation Plan, which provides long- term protection of natural and cultural resources on adjacent U.S. Forest Service and Bureau of Land Management lands; (6) *Yosemite Valley Plan*, which implements the goals of the 1980 *General Management Plan* in Yosemite Valley, is designed to meet resource preservation and visitor experience goals in Yosemite Valley, including natural and cultural resource management and restoration, visitor services and recreational opportunities, transportation, and employee housing; (7) Mariposa County General Plan Update, which provides guidance for land use, zoning, and development throughout Mariposa County; and (8) Yosemite Area Regional Transportation System (YARTS), which evaluates the feasibility of a regional transportation system and identifies the best options for initial implementation and upkeep of such a system.

Impairment

Impairment is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. The need to analyze and disclose impairment impacts originates from the National Park Service Organic Act (1916). The Organic Act established the National Park Service with a mandate "to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

An impact would be less likely to constitute an impairment if it is an unavoidable result, which cannot reasonably be further mitigated, of an action necessary to preserve or restore the integrity of park resources or values (NPS 2000a). An impact would be more likely to constitute impairment to the extent that it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park

- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park
- Identified as a goal in the park's *General Management Plan* or other relevant National Park Service planning documents

The evaluation of impairment of park resources was based on the type and intensity of impacts and the types of resources affected. Overall, beneficial impacts would not constitute impairment. With respect to the intensity of impacts, negligible and minor adverse impacts are not of sufficient magnitude to constitute impairment. Moderate and major adverse impacts may constitute impairment, but do not automatically do so. Rather, these impacts must be analyzed with respect to the three bulleted criteria above. Impairment is generally considered for geologic, hydrological, biological, cultural, and scenic resources and recreation Impairment is addressed in the conclusion section of each impact topic under each alternative.

Methodologies and Assumptions

This section presents the methodologies and assumptions used to conduct the environmental impact analyses for each resource topic.

Geology, Geologic Hazards, and Soils

This impact assessment focuses on effects that geologic processes in Yosemite National Park could have on visitors, personnel, and facilities under each alternative of the South Fork Merced River Bridge Replacement Project. Geologic processes negatively affect visitors, personnel, and facilities when events such as earthquakes, and severe soil instability result in injury, death, or damage to facilities. The assessment also focuses on the effect of project alternatives on geologic processes, namely the formation and conservation of soil resources. Project- related actions could affect soil resources through accelerated erosion, soil loss, or soil removal.

Several assumptions regarding facility placement, geologic design parameters, and public safety were integrated into this assessment, as summarized below.

- Geologic risks to public safety are rarely predictable, and the extent of potential harm to people and property cannot be quantified. While the Wawona area is not prone to earthquakes or rockfalls, it is not possible to avoid risks due to geologic hazards, the analysis of effects was qualitative, and professional judgment was used to reach reasonable conclusions as to the context, intensity, and duration of potential impacts.
- Geotechnical studies to determine soil stability conditions would be performed prior to placing, designing, or relocating a facility within the park, and facility design within Yosemite National Park would conform to accepted building costs, particularly regarding seismic design parameters.
- Project activities would remove and/or cover the soil surface and result in significant changes to the basic soil properties of the topsoil. Excavation and removal of soil would result in a long- term impact because the basic soil properties, which have taken thousands of years to develop, would be altered. Capping the surface would reduce water movement and minimize the opportunity for the normal processes of physical transport and chemical transformations, such as illuviation, eluviation, and nutrient cycling.
- Soil excavation and redistribution would result in removal or mixing of the soil profile and disrupt soil structural characteristics, interrupting the chemical, physical, and biological processes that naturally occur in the soil. The level of change would be

dependent on the level of the alteration. It could take many years for the soil profile to redevelop.

- Soil compaction could occur as a result of project activities or in areas of intensive use such as trails. Wetland soils are very susceptible to compaction effects. Soil compaction reduces infiltration rates, thereby increasing surface runoff and the potential for erosion. Deep compaction of soils could impede subsurface flow. In turn, these effects could alter soil chemical processes such as nutrient transfer, biological processes such as root development and microbial patterns, and physical processes such as soil structure. Vegetation growth on compacted soils is often limited due to low infiltration and poor root penetration.
- Removal of vegetation through project activities or pedestrian use could result in accelerated erosion of the soil surface. Soils on steep slopes and along watercourses are especially susceptible to erosion.
- The addition of chemical constituents into the soils as a result of pavement installation, untreated runoff from paved surfaces, or from incidental spills could alter micro- or macro- organism populations, diversity, and dynamics. Machinery involved with project activities could deposit small amounts of natural and synthetic petrohydrocarbons onto soils through equipment failure and normal operations.

Ecological restoration that would minimize erosion potential and increase organic matter in the soil would be considered a beneficial effect. Short- term adverse effects could occur during site restoration activities where work equipment could compact soils, temporarily eliminate groundcover vegetation, and cause potential erosion from surface water runoff over the exposed soils.

Duration of Impact

Short- term impacts are considered temporary or transitional in nature. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long-term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent. Geologic impacts related to seismic events would likely be long-term and permanent.

Intensity of Impact

The intensity of an impact was based on its location within the park and what the types of activities and facilities are proposed in that location. The intensity of the impact would be negligible if facilities of any kind are located outside geologic hazard zones, or in rock areas with no soil resources.

There will always be a potential for adverse impacts to life and property due to seismic hazards, especially in developed areas. Therefore, management actions to avoid placement of facilities in areas susceptible to seismic hazards may decrease the risks but would not necessarily reduce the intensity of the impact.

For soils, impact intensity was characterized as negligible, minor, moderate, or major. Negligible impacts would be imperceptible or not detectable. Minor impacts would be slightly perceptible and localized. Moderate impacts would be apparent and have the potential to become larger. Major impacts would be substantial, highly noticeable, and may be permanent.

Type of Impact

All seismic events are potentially hazardous. The type of impact is related to risk, and it is difficult to estimate risk involving natural events. In general, reducing risk would be considered a beneficial impact. Generally, maintaining facilities within or moving facilities into a zone of higher risk or exposing people to greater levels of risk would be considered adverse.

Beneficial impacts to soils protect or restore natural soil conditions including abiotic and biotic components, soil structure, and moisture. Adverse impacts would result in degradation of chemical, physical, abiotic, or biotic soil components.

Hydrology, Floodplains, and Water Quality

Impacts on hydrology, floodplain values, and water quality are discussed under this resource topic. Hydrology refers to hydrologic processes such as flooding, erosion and deposition, and channel movement. Particular attention was given to alterations or restoration of water flow (e.g., placement or removal of facilities in the South Fork Merced River channel). Floodplain values are attributes of flooding that contribute to ecosystem quality, such as recharge of riparian ground water. Particular attention was given to alterations or restoration of the floodplain (e.g., placement or restoration of facilities in a floodplain). Water quality refers to the suitability of surface water for recreational use and wildlife habitat, particularly the enhancement or degradation of water quality. The National Park Service *Freshwater Resource Management Guidelines* (found in Procedural Manual- 77) requires the National Park Service to "maintain, rehabilitate, and perpetuate the inherent integrity of water resources and aquatic ecosystems." The Clean Water Act requires the National Park Service to "comply with all Federal, State, interstate, and local requirements, administrative authority, and process and sanctions respecting the control and abatement of water pollution.

This assessment focuses on the physical and chemical processes of the Merced River, and how (relative to the No Action Alternative – Alternative 1) the action alternative would affect hydrologic processes, both during project activities and following project completion. The hydrology impact assessment herein evaluates how project activities would affect channel morphology, flooding, and water quality.

Channel Morphology

The analysis examines potential changes to channel morphology (channel depth, position, and streamflow) as a result of the alternatives. This section addresses existing and potential future restrictions to streamflow, potential repositioning of the channel bed, potential channel bed scour and bank erosion or instability, flow rates, and sediment transport mechanics.

Floodplains

National Park Service policy is to protect natural floodplain values and functions, and to minimize risk to life or property by avoiding the use of the regulatory floodplain whenever there is a feasible alternative. Impacts are evaluated in this section based on the potential to avoid loss of life and property during major floods. This section qualitatively analyzes the impacts or benefits to the river's floodplain for the two alternatives.

The National Park Service manages floodplains in accordance with Executive Order 11988 (*Floodplain Management*) and the National Park Service Special Directive 93- 4 (*Floodplain Management Guidelines* [NPS 1993b]). The regulatory floodplain is defined as the 100- year, 500-

year, or maximum possible flood, depending on the type of activity and the amount of risk inherent in the nature of flooding at a location. Generally, the regulatory flood is the 100- year flood for most park functions in non- flash- flood environments. For critical facilities such as schools, hospitals, and large fuel- storage facilities, the regulatory floodplain is defined as the 500-year floodplain in non- flash- flood areas. Facilities such as picnic areas and day- visitor parking are exempt from the National Park Service guidelines because they are often located near water for the enjoyment of visitors and do not involve overnight occupation.

When there is no practicable alternative to placing facilities in a floodplain, National Park Service policy permits the use of the floodplain when there are compelling reasons for doing so, when the level of impact to natural floodplain processes is acceptable, and when mitigation is provided to protect human life and property. A statement of findings must be written to document a decision to place facilities within a floodplain.

Water Quality

This section identifies potential effects on water quality associated with project activities, such as the eventual collapse of the South Fork Bridge and associated rupturing of the sewerline attached to the bridge.

Duration of Impact

Short- term impacts are considered temporary or transitional. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long- term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

Negligible impacts would be imperceptible or not detectable. Minor impacts would be slightly perceptible and localized, without the potential to expand if left alone. Moderate impacts would be apparent and have the potential to become larger. Major impacts would be substantial, highly noticeable, and may be permanent.

Type of Impact

Adverse impacts alter natural hydrologic conditions (e.g., impede flood flows, cause unnatural erosion or deposition, etc.) or degrade water quality (e.g., increase pollution or bacteria levels). Beneficial impacts would be those that restore natural hydrologic conditions (e.g., remove impediments to flood flows, stabilize riverbanks, etc.) or improve water quality (e.g., reduce potential for nonpoint source and point source pollution).

Wetlands

Wetlands and riparian areas are relatively rare in the context of the entire landscape. However, modification of even small wetland areas induces effects that are proportionally greater than elsewhere in an ecosystem (UC Davis 1996b).

The National Park Service is committed to minimizing wetland loss. The wetland protection statutes that guide the National Park Service include Executive Order 11990 (*Protection of Wetlands*); the National Park Service's Director's Order – 77- 1: Wetland Protection, and its

accompanying Procedural Manual #77- 1; Clean Water Act Section 404; and the "no net loss" goal outlined by the White House Office on Environmental Policy in 1993. Executive Order 11990 requires that leadership be provided by involved agencies to minimize the destruction, loss or degradation of wetlands. Director's Order – 77- 1 and Procedural Manual #77- 1 provide specific procedures for carrying out the executive order. Section 404 of the Clean Water Act authorizes the U.S. Army Corps of Engineers to grant permits for construction and disposal of dredged material in waters of the United States. Wetland impacts were estimated using wetland- specific data collected in the field during the fall of 2002. Wetland data were compared with each alternative to determine the area of potential effect. This analysis considers whether proposed actions could breach applicable federal laws, regulations, or executive orders.

Duration of Impact

Short- term impacts are considered temporary or transitional. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long- term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

Three primary measures were used to evaluate the intensity of impacts on wetlands: the size and type of the wetland, the integrity of the wetland, and the connectivity of the wetland to adjacent habitats.

The intensity of impacts has been described as negligible, minor, moderate, or major. Negligible impacts would be imperceptible or not detectable. Minor impacts would be slightly detectable, localized within a small area, and would not affect the overall viability of wetlands in the park. Moderate impacts would be apparent and have the potential to become major impacts. Major impacts would be substantial, highly noticeable, and could become permanent.

Type of Impact

Adverse impacts would degrade the size, integrity, or connectivity of wetland. Conversely, beneficial impacts would enlarge the size or enhance the integrity and connectivity of wetlands.

Vegetation

Impacts on vegetation communities were assessed in terms of duration, type, and intensity in site-specific, parkwide, and regional contexts.

Duration of Impact

Short- term impacts are considered temporary or transitional. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long- term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

Impacts on vegetation communities are assessed in terms of duration, type, and intensity in site-specific, parkwide, and regional contexts. Two primary parameters are used to evaluate the intensity of impacts on vegetation: (1) the size and continuity of the plant community, and (2) the natural structure, productivity, diversity (integrity), and rarity of the plant community.

Non- native species are discussed in terms of presence on previously disturbed sites and as invasive species within existing plant communities. Mitigation measures were applied, as applicable, to prevent impacts related to the introduction and spread of non- native plant species; however, they would continue to be managed by park staff in conjunction with National Park Service programs responsible for protection and long- term management of vegetation resources.

Human use impacts such as recreational use and foot traffic can extend beyond developed areas and affect plant community size and continuity. Human use can disturb or compact soils, create conditions favorable for non- native species or introduce non- native species, and trample native vegetation cover. Human use impacts that extend beyond development boundaries were considered as factor in determining the intensity of impacts on vegetation.

New development within an otherwise intact and undisturbed area may fragment or disassociate plant communities. Small areas of restoration surrounded by existing or new development may constitute a lesser beneficial impact on plant communities than restoration of a small area adjacent to a larger intact community. In general, reducing and limiting fragmentation, and maintaining connections within and among plant communities can minimize adverse effects on plant communities.

The evaluation of the integrity of plant communities was based on:

- Biodiversity
- Opportunities for natural processes to occur such as fire and flooding
- Exotic species introduction and spread
- Resilience of the plant community

In this document, biodiversity refers to the diversity of communities within an ecosystem, the diversity of species within a community, and genetic variation among individual species. Measures of biodiversity may include plant community structure and composition, connectivity of ecosystems, variation in age, structure (density and arrangement), individual species composition and abundance, and the presence or absence of natural structural layers.

Natural processes such as fire and flooding sustain many plant communities. This impact analysis considered whether changes would occur to opportunities for natural processes (or management options such as prescribed burning) to take place. For example, new development may prohibit opportunities for prescribed natural fire.

Non- native species can alter soil chemical and physical properties, hamper native species establishment, and ultimately alter native plant community structure and function. This impact analysis considered whether proposed actions would favor the establishment of non- native species, and the ability to contain and reverse non- native plant infestation.

Negligible impacts would have no measurable or perceptible changes in plant community size, continuity, or integrity. Minor impacts would be measurable or perceptible and localized within a relatively small area and the overall viability of the plant community would not be affected. Moderate impacts would cause a change in the plant community (e.g., size, continuity, and integrity); however, the impact would remain localized. The change would be measurable and

perceptible, but could be reversed. Major impacts would be substantial, highly noticeable, and could be permanent in their effect on plant community size, diversity, continuity, or integrity.

Type of Impact

Impacts were classified as adverse if they would reduce the size, continuity, or integrity of a plant community. Conversely, impacts were classified as beneficial if they would increase the size, continuity, or integrity of a plant community.

Wildlife

This section addresses the effects of alternatives on wildlife and their habitat, as represented by general vegetation types and riverine conditions present. The correlation of vegetation impacts and effects on wildlife is described within this section. Adverse effects to wildlife without modifications to wildlife habitat, are also considered.

In general, adverse effects on wildlife can be minimized by reducing and limiting habitat fragmentation; that is, by preserving and restoring large areas of habitat, patches of habitat, and maintaining connections within and among habitat types. Larger patches of habitat tend to support higher numbers and diversity of wildlife species than smaller ones, and connections between habitat patches enable the movement of wildlife between areas, enhancing reproduction and survival. Small patches of habitat can serve as stepping- stones for wildlife moving between larger blocks.

Ultimately, the value of a restored area or the impact of a developed area to wildlife is determined by the characteristics of the species affected. Home range size, tolerance of human disturbance, and life- history characteristics determine whether a species reoccupies a restored area or abandons a disturbed area.

Impacts on wildlife have been assessed in terms of changes in the amount and distribution of wildlife habitat, the size and connectivity of habitat, the integrity of the site (including past disturbance), the potential for habituation of wildlife to humans, and the relative importance of habitats.

Duration of Impact

Short- term impacts are considered temporary or transitional. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. These impacts would end with cessation of construction activity, or soon thereafter, and include:

- Noise, dust, and light emanating from construction sites could affect the use of surrounding habitats by wildlife.
- Vegetation removed, trampled, or run- over during temporary use of some habitat as areas for staging of machinery or materials would affect wildlife until such areas could be restored after the project.
- Diversion of water flows during construction would result in unnatural drying or wetting of habitats adjacent to sites.
- Wildlife could be killed by traffic or machinery associated with construction.
- Pits and trenches could entrap wildlife, resulting in their death.
- Spills of fuel, oil, hydraulic fluid, antifreeze, and other toxic chemicals could affect wildlife, especially those in aquatic environments.

- Construction personnel, at in- park residences or at work sites, could provide a source of human food to wildlife, resulting in conditioning of wildlife and in human/wildlife conflicts.

Long- term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

Negligible impacts are impacts that would not be measurable or perceptible. Minor impacts would be measurable or perceptible and would be localized within a relatively small area; however, the overall viability of the resource would not be affected. Without further impacts, negative effects would be reversed, and the resource would recover. Moderate impacts would be sufficient to cause a change in the resource (e.g., abundance, distribution, quantity, or quality); however, the impact would remain localized. The change would be measurable and perceptible, but negative effects could be reversed. Major impacts would be substantial, highly noticeable, and could be permanent without active management.

Type of Impact

Impacts were classified as adverse if they would negatively affect the size, continuity, or integrity of wildlife habitat, or result in unnatural changes in the abundance, diversity, or distribution of wildlife species. Conversely, impacts were classified as beneficial if they would positively affect the size, continuity, or integrity of wildlife habitat.

Special-Status Species

Wildlife

This analysis includes species listed under the Endangered Species Act as threatened or endangered; species that are Candidates for listing under the Endangered Species Act; species given Species of Concern status by the United States Fish and Wildlife Service; species listed by the State of California as threatened, endangered, or species of concern; and locally rare species of special importance to the park. The impact evaluation for special- status wildlife species was based on the following: (1) the known or likely occurrence of a species or its preferred habitat in the vicinity of the project area; (2) the direct physical loss or adverse modification of habitat; (3) the effective loss of habitat (through avoidance or abandonment) due to construction activity or noise, or the species' sensitivity to human disturbance.

Habitat fragmentation is also a critical factor for special- status species. Restored blocks of habitat should be large enough to support viable populations, and intact habitat should not be reduced or affected to the point that it would no longer support viable populations. A more detailed discussion of impact duration, intensity, and type is included in the preceding Wildlife section.

Plants

This analysis includes species given Species of Concern status by the United States Fish and Wildlife Service; species listed by the State of California as threatened, endangered, rare, or species of concern; and locally rare species of special importance to the park. The impact evaluation for special- status plant species was based on the following: (1) the known or likely occurrence of a species or its preferred habitat in the vicinity of the project area; (2) the direct

physical loss of habitat; (3) the effective loss of habitat through loss of habitat features such as surface water flows.

Duration of Impact

Short- term impacts are considered temporary or transitional in nature. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long-term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

Negligible impacts are impacts that would not be measurable or perceptible. Minor impacts would be measurable or perceptible and would be localized within a relatively small area; however, the overall viability of the resource would not be affected. Without further impacts, negative effects would be reversed, and the resource would recover. Moderate impacts would be sufficient to cause a change in the resource (e.g., abundance, distribution, quantity, or quality); however, the impact would remain localized. The change would be measurable and perceptible, but negative effects could be reversed. Major impacts would be substantial, highly noticeable, and could be permanent without active management.

Type of Impact

Impacts were classified as adverse if they would negatively affect population size, or habitat size, continuity, or integrity of a special- status species. Conversely, impacts were classified as beneficial if they would positively affect population size, or the size, continuity, or integrity of habitat.

Air Quality

The creation of pollutants resulting from the implementation of an alternative can contribute to an impact on air quality; however, air quality is a regional issue that is influenced by factors outside the immediate area. For example, the California Environmental Protection Agency concluded that the ozone exceedances in 1995 in the southern portion of the Mountain Counties Air Basin (i.e., Tuolumne and Mariposa Counties) were caused by transport of ozone and ozone precursors from the San Joaquin Valley Air Basin.

The air quality impact assessment involved the identification and qualitative description of the types of activities associated with each of the alternatives that could affect air quality, corresponding emissions sources and pollutants, and relative source strengths. Based on the relative source strengths, a qualitative assessment was performed to determine the potential for higher pollutant emissions or concentrations, taking into account the frequency, magnitude, duration, location, and reversibility of the potential impact. In addition, regional pollutant transport issues were evaluated in the context of regional cumulative impacts.

Neither the National Park Service nor the Mariposa County Air Pollution Control District has established emissions- based criteria for evaluating the significance of project implementation impacts (NPS 2003a). Without such recommendations, the typical approach is to qualitatively evaluate the significance of temporary demolition- related impacts. The analysis of effects herein is qualitative, and professional judgment has been applied to reach reasonable conclusions as to the context, intensity, and duration of potential impacts. When possible, mitigation measure(s) are incorporated into the project to reduce the intensity of adverse effects.

Air quality impacts were evaluated in terms of intensity and duration and whether the impacts were considered beneficial or adverse. Cumulative effects on air quality were also considered based on past, present, and reasonably foreseeable future actions occurring in Yosemite National Park, in combination with the potential air quality effects of each alternative.

Duration of Impact

Short- term impacts are considered temporary, transitional, or bridge- removal related impacts associated with the project activities. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long- term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

Negligible impacts would be imperceptible or not detectable. Minor impacts would be slightly perceptible and localized, without the potential to expand if left alone. Moderate impacts would be apparent and have the potential to become larger. Major impacts would be substantial, highly noticeable, and may be permanent.

Type of Impact

Impacts were considered beneficial or adverse to air quality. Beneficial air quality impacts would reduce emissions or lower pollutant concentrations, while adverse impacts would increase emissions or raise pollutant concentrations.

Noise

The noise impact assessment involves the identification and qualitative description of the types of actions that could affect the ambient noise environment, corresponding noise sources, relative source strengths, and other characteristics. Based on the relative source strengths, a qualitative assessment was performed to determine the potential for an increase in ambient noise levels. Assessments were also performed where noise- sensitive uses are located or would expose persons to excessive noise levels, taking into account the frequency, magnitude, duration, location, and reversibility of the potential impact.

Duration of Impact

Short- term impacts are considered temporary or transitional in nature. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long-term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

Negligible impacts would be imperceptible or not detectable. Minor impacts would be slightly perceptible and localized, without the potential to expand if left alone. Moderate impacts would be apparent and have the potential to become larger. Major impacts would be substantial, highly noticeable, and may be permanent.

Type of Impact

Impact type was evaluated using the following definitions: beneficial impacts would be created through a reduction in decibels, and adverse impacts would be created through an increase in decibels.

Cultural Resources

This impact analysis methodology applies to three types of cultural resources: archeological sites, ethnographic resources, and cultural landscape resources (including individually significant historic structures and historic districts).

Section 106 of the National Historic Preservation Act, as amended, requires a federal agency to take into account the effects of its undertakings on properties included in, eligible for inclusion in, or potentially eligible for inclusion in the National Register of Historic Places, and provide the Advisory Council on Historic Preservation the reasonable opportunity to comment. A Programmatic Agreement (1999) was developed among the National Park Service at Yosemite, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation, in consultation with American Indian tribes and the public, to take into account the effects of park planning and operations on historic properties.

The methodology for assessing impacts to historic resources is based on stipulations V through VIII of the Programmatic Agreement (ACHP 1999). This includes: (1) establishing an area of potential effect; (2) assessing the background information regarding historic properties within this area and conducting any necessary surveys, inventories, and resource evaluations; (3) comparing the location of the impact area with that of resources listed, eligible, or potentially eligible for listing in the National Register of Historic Places; (4) identifying the extent and type of effects; (5) assessing those effects according to procedures established in the Advisory Council on Historic Preservation's regulations; and (6) considering ways to avoid, reduce, or mitigate adverse effects.

Cultural resource impacts in this document are described in terminology consistent with the regulations of the Council on Environmental Quality, and in compliance with the requirements of the National Environmental Policy Act, Section 106 of the National Historic Preservation Act, and the 1999 Programmatic Agreement regarding the Planning, Design, Construction, Operations and Maintenance of Yosemite National Park.

Duration of Impact

Impacts to historic properties (cultural resources) could be of short term, long term, or permanent duration. Analysis of the duration of impacts is required under National Environmental Policy Act, but is not required and is not usually considered in assessing effects in terms of National Historic Preservation Act.

Type of Impact

Impacts are considered either adverse or beneficial to historic properties (cultural resources) when analyzed under the National Environmental Policy Act. However, impact type is not viewed this way when conducting analysis under Section 106 of the National Historic Preservation Act. For the purposes of assessing effects to historic properties under the National Historic Preservation Act, effects are either adverse or not adverse. Effects under both the National Environmental Policy Act and the National Historic Preservation Act are considered adverse when they diminish the significant characteristics of a historic property.

Impacts can be either direct or indirect. Direct impacts result from specific actions, such as demolition of historic structures. Indirect impacts generally occur after project completion, and are a result of changes in visitor- use patterns or management of resources fostered by implementation of an action.

Intensity of Impact

The intensity of an impact on a cultural resource can be defined as negligible, minor, moderate, or major. Negligible impacts would be barely perceptible changes in significant characteristics of a historic property. Minor impacts would be perceptible and noticeable, but would remain localized and confined to a single element or significant characteristic of a historic property (such as a single archeological site containing low data potential within a larger archeological district, or a single contributing element of a larger historic district). Moderate impacts would be sufficient to cause a noticeable but not substantial change in significant characteristics of a historic property (such as an archeological site with moderate data potential or a small group of contributing elements within a larger historic district). Major impacts would result in substantial material alteration or destruction of the property or cause highly noticeable changes to any qualifying characteristics of a property that contribute to its historic significance (such as an archeological site with high data potential or a large group of contributing elements within a larger historic district).

The National Environmental Policy Act also calls for a discussion of the "appropriateness" of mitigation, and an analysis of the effectiveness of mitigation. A reduction in intensity of impact from mitigation is an estimate of the effectiveness of this mitigation under the National Environmental Policy Act. It does not suggest that the level of effect, as defined by implementing regulations for Section 106 of the National Historic Preservation Act, is similarly reduced. Although adverse effects under Section 106 may be mitigated, the effects remain adverse.

Mitigation in this document is based on the Programmatic Agreement and includes the avoidance of adverse effects or the application of one or more standard mitigation measures as described in stipulations VII (C) and VIII of the Programmatic Agreement. Avoidance strategies may include the application of the *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation* (USDOI 1983), design methods such as vegetation screening when placing new facilities in a historic district, and the development of guidelines to ensure compatibility between new and existing facilities. Stipulation VIII of the Programmatic Agreement requires the National Park Service notify the State Historic Preservation Officer, American Indian tribes, and certain members of the public of its decision to implement standard mitigation measures as described in Stipulation VIII (A) for individual actions having an adverse effect on historic properties.

Presented below are the specific discussions of duration, intensity, and type of impacts to cultural resources, and a description of typical mitigation measures.

Archeological Resources

Archeological resources are typically considered eligible for inclusion in the National Register of Historic Places because of the information they have or may be likely to yield (36 CFR 60.4).

Any change in the physical attributes of an archeological site is irreparable and considered adverse and of permanent duration. Adverse impacts to archeological resources most often occur as a result of earthmoving activities within an archeological site area, soil compaction or increased erosion, unauthorized surface collection, or vandalism. Beneficial impacts to archeological resources can occur when patterns of visitor use or management action are changed near archeological resources such that an ongoing impact, which would otherwise continue to degrade

archeological resources, is reduced or arrested. Direct impacts can occur as a result of grading, trenching, or other activities that damage the structure of an archeological site. Indirect impacts can occur as a result of increasing visitor activity or management action near an archeological site, leading to things such as artifact collection, accelerated soil compaction, and erosion.

The intensity of impact to an archeological resource would depend upon the potential of the resource to yield important information, as well as the extent of the physical disturbance or degradation. For example, major earthmoving at an archeological site with low data potential might result in a minor, adverse impact. Negligible impacts would be barely perceptible and not measurable, and would usually be confined to archeological sites with low data potential. Minor impacts would be perceptible and measurable, and would remain localized and confined to archeological site(s) with low to moderate data potential. Moderate impacts would be sufficient to cause a noticeable change, and would generally involve one or more archeological sites with moderate to high data potential. Major impacts would result in substantial and highly noticeable changes, involving archeological site(s) with high data potential.

For archeological resources, mitigation includes avoidance of sites through project design, or recovery of information that makes sites eligible for inclusion in the National Register of Historic Places. According to Stipulation VII (C) of the Programmatic Agreement, impacts to archeological resources are considered not adverse for purposes of Section 106 of the National Historic Preservation Act if data recovery is carried out in accordance with the *Archeological Synthesis and Research Design* (Hull and Moratto 1999).[1]

Ethnographic Resources

Ethnographic resources are considered eligible for inclusion in the National Register of Historic Places as traditional cultural properties (or places) when: (1) a district, site, building, structure, or object is rooted in a community's history and is important for maintaining the continuing cultural identity of the community; and (2) the property(ies) meet National Register criteria for significance and integrity.

Impacts to ethnographic resources occur as a result of changes in the physical characteristics, access to, or use of resources, such that the cultural traditions associated with those resources are changed or lost. Beneficial impacts can occur when intrusive facilities, or visitor or management activities are removed from a traditional use area; when ecological conditions are improved at a gathering area such that the traditionally used resource is enhanced; or when access for American Indian people is enhanced. Adverse impacts occur when physical changes to a traditionally used resource or its setting degrade the resource itself, or degrade access to or use of a resource.

Impacts are considered short term if they represent a temporary change in important vegetation or temporarily restrict access to an important resource, and do not disrupt the cultural traditions associated with that resource for a noticeable period of time. They are considered long term if they involve a change in important vegetation or cultural feature, or addition of a new facility or visitor use that would change the physical character of or access to a resource for a noticeable period of time. This period of time would vary by resource type and traditional practitioners. These long- term changes would disrupt cultural tradition(s) associated with the affected resource, but the disruption would not alter traditional activities to the extent that the important cultural traditions associated with the resource are lost. Permanent impacts to ethnographic resources would involve irreversible changes in important resources such that the ongoing cultural traditions associated with those resources are lost.

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[1] *Under the Advisory Council on Historic Preservation's revised regulations of June 17, 1999 (36 CFR 800, Protection of Historic Properties; Final Rule and Notice), data recovery is considered to be an adverse effect. However, according to part 800.3 (A)(2) of these regulations, provisions of programmatic agreements in existence at the effective date of the new regulations remain in effect.*

The intensity of impacts to an ethnographic resource would depend on the importance of the resource to an ongoing cultural tradition, as well as the extent of physical damage or change. Negligible impacts would be barely perceptible and not measurable, and would be confined to a small area or single contributing element of a larger National Register district (such as the ethnographic landscape). Minor impacts would be perceptible and measurable, and would remain localized and confined to a single contributing element of a larger National Register district. Moderate impacts would be sufficient to cause a change in a significant characteristic of a National Register district or property, and/or would generally involve a small group of contributing elements in a larger National Register district. Major impacts would result in substantial and highly noticeable changes in significant characteristics of a National Register district or property, and/or would involve a large group of contributing elements in a larger National Register district and/or an individually significant property.

The National Park Service would continue to consult with culturally associated American Indian tribes according to stipulations of the Programmatic Agreement, as well as specific agreements such as the October 17, 1997 "Agreement Between the National Park Service, Yosemite National Park, and the American Indian Council of Mariposa County, Inc. for Conducting Traditional Activities," to develop appropriate strategies to mitigate impacts on ethnographic resources. Such strategies could include identification of and assistance in providing access to alternative resource gathering areas, continuing to provide access to traditional use or spiritual areas, and screening new development from traditional use areas.

Cultural Landscape Resources, Including Individually Significant Historic Sites and Structures

Impacts to cultural landscape resources result from physical changes to significant characteristics of a resource or its setting. Beneficial impacts can occur as a result of restoration or rehabilitation of resources, or removal of incompatible or noncontributing facilities. Direct, adverse impacts generally occur as a result of modifying a significant characteristic of a historic structure or landscape resource; removal of a significant structure or landscape resource; or addition of new, incompatible facilities in proximity to a historic site or structure. Indirect adverse impacts can also occur following project completion. These impacts are generally associated with changes in historic vegetation, or continued deterioration of historic structures. They are considered indirect impacts, as they are not directly associated with project construction, but rather result from increased visitor use or change in management of resources fostered by the completed plan.

Impacts to historic structures and cultural landscape resources are considered short term if they involve activities such as temporary removal of vegetation or other contributing resources, road closures, or prescribed burns, where the impacts are noticeable for a period of from one to five years. Other examples of short- term Impacts to historic structures include constructing scaffolding surrounding a building during rehabilitation work, or minor deterioration in historic fabric that is repairable as part of routine maintenance and upkeep. Impacts are considered long term if they involve a reversible change, lasting from five to twenty years, in a significant characteristic of a historic structure or landscape. These changes could include such actions as alteration of contributing resources or construction of an incompatible building addition or adjacent facility. Permanent impacts to a historic structure or landscape resources would include irreversible changes in significant characteristics, such as removal of contributing resources; restoration of natural systems and features; irreversible removal of historic fabric that changes the historic character of a property; or demolition of a historic structure.

Negligible impacts would be barely perceptible and not measurable and would be confined to small areas or a single contributing element of a larger National Register district. Minor impacts would be perceptible and measurable but remain localized and confined to a single contributing element of a larger National Register district. Moderate impacts would be sufficient to cause a change in a significant characteristic of an individually significant historic structure, or would

generally involve a single or small group of contributing elements in a larger National Register district. Major impacts would result from substantial and highly noticeable changes in significant characteristics of an individually significant historic structure, or would involve a large group of contributing elements in a National Register district.

Mitigation measures for historic structures and cultural landscape resources include measures to avoid impacts, such as rehabilitation and adaptive reuse, designing new development to be compatible with surrounding historic resources, and screening new development from surrounding historic resources. In situations where a historic structure was proposed for removal, the National Park Service would first consider options for relocating the structure to another location in the park for adaptive reuse. Standard mitigation measures, as defined in the Programmatic Agreement, include documentation according to standards of the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER). The level of this documentation, which includes photography and a narrative history, would depend on the significance of a resource (national, state, or local) and the nature of the resource (an individually significant structure, contributing elements in a cultural landscape or historic district, etc.). When a historic structure is slated for demolition, architectural elements and objects may be salvaged for reuse in rehabilitating similar structures, or they may be added to the park's museum collection. In addition, the historical alteration of the human environment and reasons for that alteration would be interpreted to park visitors.

Socioeconomics

The socioeconomic impact analysis qualitatively evaluates the effects of project alternatives on the regional economy. Due to the structure of the local economic relationships and the nature of the bridge replacement activities, these impacts are addressed in terms of Wawona and Mariposa Counties as a whole. Professional judgment was applied to reach reasonable conclusions as to the context, duration, and intensity of potential impacts.

The analysis considered both direct and secondary project- related spending effects. Direct effects represent the immediate spending within the sector of the economy where the initial stimulus occurs. Secondary effects include indirect effects and induced effects. Indirect effects represent the impact of the initial stimulus on the economy as a result of changes in business spending. Induced effects are the impacts of the initial stimulus on the economy from changes in personal consumption (as a result of changes in employee income). Total project- related spending is the combination of both direct and secondary spending effects.

Duration of Impact

Impact also included an assessment of duration. Distinguishing between short- term and long-term duration was necessary to understand the extent of the identified effects. In general, short-term impacts are temporary in duration and typically are transitional effects associated with implementation of an action (e.g., related to construction activities). In contrast, long- term impacts have a permanent effect on the social and economic environments (e.g., operational activities).

Intensity of Impact

The intensity of each impact was rated in terms of increasing severity, as negligible, minor, moderate, or major. Negligible impacts are effects considered not detectable and are expected to have no discernible effect on the socioeconomic environment. Minor impacts are slightly detectable and are not expected to have an overall effect on the character of the socioeconomic environment. Moderate impacts are detectable, without question, and could have an appreciable

effect on the socioeconomic environment. Such impacts would have the potential to initiate an increasing influence on the socioeconomic environment (particularly if other factors have a contributing effect). Major impacts are considered to have a substantial, highly noticeable influence on the socio economic environments, and could be expected to alter those environments permanently.

Type of Impact

Impacts were recognized as beneficial if they would improve upon characteristics of the existing socioeconomic environment, as it relates to Wawona and Mariposa Counties as a whole. Conversely, impacts were considered adverse if they would degrade or otherwise negatively alter the characteristics of the existing environment.

Transportation

This impact assessment focuses on the effect of temporary changes to the roadway system and parking spaces on traffic volumes and associated traffic flow, access and circulation, and safety conditions. Vehicle access over the South Fork Merced River would be maintained during bridge replacement through the use of the temporary Bailey bridge.

The analysis of effects is based on professional transportation engineering judgment. Relative to the No Action Alternative (Alternative 1), the Preferred Alternative (Alternative 2), which calls for complete replacement of the South Fork Bridge, would affect traffic flows, access and circulation, and safety during project work. Transportation impacts are evaluated in terms of their context, duration, and intensity, and whether the impacts are considered to be beneficial or adverse.

Duration of Impact

Short- term impacts are considered temporary, transitional, or bridge- removal related impacts associated with the project activities. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long- term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

The intensities of impacts consider whether the impact would be negligible, minor, moderate, or major. Negligible impacts are effects considered not detectable and would have no discernible effect on traffic flow and/or traffic safety conditions. Minor impacts are effects on traffic flow and/or traffic safety conditions that would be slightly detectable, but not expected to have an overall effect on those conditions. Moderate impacts would be clearly detectable and could have an appreciable effect on traffic flow and/or traffic safety conditions. Major impacts would have a substantial, highly noticeable influence on traffic flow and/or traffic safety conditions and could permanently alter those conditions.

Type of Impact

Impacts are considered in the context of being either beneficial or adverse on traffic flow and/or traffic safety conditions. Beneficial impacts would improve traffic flow and traffic safety by reducing levels of congestion and occurrences of vehicle/vehicle, vehicle/bicycle, and vehicle/pedestrian conflicts. Adverse impacts would negatively alter traffic flow and traffic safety by increasing levels of congestion and occurrences of such conflicts.

Scenic Resources

The overriding management purpose of any national park, as defined by the National Park Service 1916 Organic Act, is to conserve the scenery and natural and historic objects. Following this direction, the National Park Service determined impacts on scenic resources by examining the potential effects of the South Fork Merced River Bridge Replacement Project on the landscape character and/or features and how any changes may be experienced (visibility, viewpoints, etc.).

Impacts of the South Fork Merced River Bridge Replacement Project on visual resources were examined and determined by:

- Comparing the existing visual character of the landscape in terms of the color, contextual scale, and formal attributes of landscape components and features, and the degree to which project actions would affect (i.e., contrast or conform with) that character; and
- Analyzing changes in experiential factors, such as whether a given action would result in a visible change, the duration of any change in the visual character, the distance and viewing conditions under which the change would be visible, and the number of viewers that would be affected.

Scenic resources impacts consist of substantial changes that would alter (1) existing landscape character, whether foreground, intermediate ground, or background, and would be visible from viewpoints the National Park Service has established as important; (2) access to historically important viewpoints or sequence of viewpoints; or (3) the visibility of a viewpoint or sequence of viewpoints.

Duration of Impact

Short- term impacts are considered temporary or transitional in nature. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long-term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

The magnitude of impacts to the scenery within the view from specific vantage points and to specific scenic features is described as negligible, minor, moderate, or major as described below. Negligible impacts would be imperceptible or not detectable. Minor impacts would be slightly detectable or localized within a relatively small area. Moderate impacts would be those that are readily apparent. Major impacts would be substantial, highly noticeable, and/or result in changing the character of the landscape.

Type of Impact

Impacts were evaluated in terms of whether they would be beneficial or adverse to scenic resources. Beneficial impacts would enhance the existing landscape character, access to historically important viewpoints or sequence of viewpoints, or the visibility of a viewpoint or sequence of viewpoints. Adverse impacts would be effects that reduce the existing landscape character, access to historically important viewpoints or sequence of viewpoints, or the visibility of a viewpoint or sequence of viewpoints.

Recreation

This analysis evaluates the quality of recreation opportunities in terms of how they might be altered as a result of the alternatives. Developing a quantitative analysis of potential effects on recreation is not feasible. Analysis of effects is, therefore, qualitative and professional judgment was applied to reach reasonable conclusions as to the context, intensity, and duration of potential impacts.

Yosemite National Park, including the South Fork Merced River and the Wawona area, offers a broad spectrum of recreation opportunities, including access to and availability of such activities as use of non- motorized watercraft (e.g., rafts, inner tubes, kayaks), swimming and wading, hiking, backpacking, camping, rock climbing, fishing, sightseeing, photography, nature study, and bicycling. In addition, every visitor to Yosemite National Park brings unique expectations and thus, each has a unique experience. As a result, the environmental assessment identifies, where possible, how the quality of the experience would change as a result of removing and replacing the South Fork Bridge and removing the temporary Bailey bridge.

An assumption that frames the analysis was that visitor demand will increase over existing levels and will be the same for both alternatives. Analysis was based on whether there was a complete loss of a recreation opportunity, a change in access to or availability of a recreation opportunity, or a change in the aggregate of recreation opportunities for the visitor.

Duration of Impact

Short- term impacts are considered temporary or transitional in nature. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long-term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

The intensity of impacts has been defined as negligible, minor, moderate, and major. Negligible impacts would result in little noticeable change in visitor experience. Minor impacts would result in changes but without appreciably limiting or enhancing opportunities for recreation. Moderate impacts would change the recreational opportunities. Major impacts would eliminate or greatly enhance recreational opportunities

Type of Impact

Impacts were evaluated in terms of whether they would be beneficial or adverse to recreational opportunities. Beneficial impacts would enhance visitor participation and the quality of visitor experience. Adverse impacts would be effects that reduce visitor participation and quality of visitor experience.

Park Operations and Facilities

For purposes of this analysis, an alternative is assumed to have an impact (negative or beneficial on park operations and facilities) if it:

- Results in direct changes to park operation, facilities, or staffing requirements or policies associated with park operations

- Causes indirect effects on park operations staffing, such as effects on utility and roadway infrastructure, flooding, and impacts on provision of utilities, especially potable water and sewer services

Duration of Impact

Short- term impacts are considered temporary, transitional, or bridge- removal related impacts associated with the project activities. Short- term impacts would be associated with South Fork Bridge removal, South Fork Bridge construction, and temporary Bailey bridge removal, and the subsequent period of time for site restoration. Long- term impacts are typically those that are evident for periods longer than 10 years following the project, and may be permanent.

Intensity of Impact

Negligible impacts would be imperceptible or not detectable. Minor impacts would be slightly perceptible and localized, without the potential to expand if left alone. Moderate impacts would be apparent and have the potential to become larger. Major impacts would be substantial, highly noticeable, and may be permanent.

Type of Impact

Adverse impacts represent an increase in park operations staffing, from effects on utility and roadway infrastructure, flooding, and impacts on provision of utilities, especially potable water and sewer services. Beneficial impacts represent a decrease in park operations staffing, from effects on utility and roadway infrastructure, flooding, and impacts on provision of utilities, especially potable water and sewer services.

Alternative 1: No Action

The No Action Alternative maintains the status quo at the South Fork Bridge site. This alternative provides a baseline from which to compare the action alternative, to evaluate the magnitude of proposed changes, and to measure the environmental effects of those changes.

Natural Resources

Geology, Geologic Hazards, and Soils

The South Fork Bridge would gradually deteriorate over the ensuing 10- year period, and the piers and abutments would continue to restrict the free flow of the South Fork Merced River, causing site- specific erosion of soil from the banks. Soils would be subject to removal by scouring near and downstream of both abutments, and possibly as the result of eddying around piers that redirects the flows toward the banks. Further bridge deterioration would have a local, short- and long- term, minor, adverse impact on soil resources near the bridge and immediately downstream.

Geologic hazards could cause further structural damage to the South Fork Bridge and contribute to greater structural degradation that could accelerate the eventual collapse of the bridge structure. As a result of sediment scouring under the piers and abutments, the foundation system of the bridge has already been severely compromised rendering it unsafe for vehicle traffic, and likely to collapse in the near future as a result of either a single event during high river flows or

gradually, as the foundation system degrades from continued scour. Ground shaking from an earthquake could also be strong enough to cause sudden bridge collapse, given the instability of the structure. Uncontrolled collapse of the bridge could result in unpredictable river flows, potentially eroding riverbanks, undermining trails and Wawona Road, and rupturing the sewage, tertiary- treated water supply lines, and other utilities fixed to the bridge.

Under Alternative 1, South Fork Bridge would continue to be subjected to possible structural damage from earthquakes. Earthquake- induced ground shaking could accelerate structural degradation reducing the period of time before the bridge collapses. The bridge is located in an area of moderate seismicity, and earthquakes from several remote sources could trigger ground shaking sufficient to cause observable ground movement at the bridge site. The bridge has withstood numerous small and some relatively large earthquakes over the past 70 years without significant damage or collapse; however, the damage sustained in the 1997 flood has substantially compromised the foundation system of the bridge.

Retrieval of bridge materials scattered downstream during an uncontrolled collapse would require multiple ingress and egress points for construction equipment and personnel, potentially destabilizing the riverbank in locations downstream from the bridge. Debris retrieval activities would result in short- term impacts to soil resources and could include excessive erosion, soil compaction, and loss of topsoil. Long- term soil impacts would include residual damage to soil resources such as bank erosion and loss of topsoil caused by diverted floodwaters following the bridge collapse. Short- term bridge debris retrieval activities and the long- term results of erosion caused by diverted flood waters would, therefore, result in local, short- and long- term, moderate, adverse impacts to soil resources. Soil resources, throughout the remainder of the South Fork Merced River corridor would be unaffected by this alternative. Therefore, Alternative 1 would result in local, short- and long- term, moderate, adverse impacts to soil resources.

Summary of Alternative 1 Impacts

Under Alternative 1, gradual deterioration of the bridge over the ensuing 10- year period would result in local, short- and long- term, minor, adverse impacts to the soil resource. The uncontrolled collapse and the retrieval of bridge debris material would cause bank destabilization, erosion, and soil loss resulting in local, short- and long- term, moderate, adverse impacts to soil resources in the immediate vicinity of the South Fork Bridge.

Cumulative Impacts

Cumulative impacts to geologic and soil resources are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor in combination with potential effects of this alternative. The lack of geological exposures at the South Fork Bridge site precludes affects to this resource. A project proposed to improve the Wawona Campground, resulting in its expansion, would affect soil resources northwest of the South Fork Bridge. Protection of soil resources in one area and disturbance in another area would result from a land exchange with the Seventh Day Adventist Camp in Wawona. Alternative 1 and the cumulative projects would result in local, short- and long- term, moderate, adverse impacts to soil resources.

Conclusions

Under Alternative 1, gradual deterioration of the bridge structure would have a local, short- and long- term, minor, adverse impact on soil resources near the bridge. An uncontrolled bridge collapse and the retrieval of debris material would cause bank destabilization, erosion, and soil loss resulting in local, short- and long- term, moderate, adverse impacts to soil resources.

Alternative 1 and the cumulative impacts would result in local, short- and long- term, moderate, adverse impacts to soil resources.

Impairment

The No Action Alternative would result in local, short- and long- term, moderate, adverse impacts to soil resources in the immediate vicinity of the South Fork Bridge due to bank destabilization, erosion, soil compaction, and soil loss. Although the South Fork Merced River system and its geologic and soil resources are key natural resource components within Yosemite National Park, the effect of this alternative on the riverbanks and soils would be localized to the immediate project area, and the effect would not be considered severe. The extent and quality of soil resources throughout the remainder of the South Fork Merced River corridor would remain unaffected by this alternative. Therefore, Alternative 1 would not impair soil resources.

Hydrology, Floodplains, and Water Quality

Under Alternative 1, the existing condition and placement of the South Fork Bridge within the floodplain would continue to adversely influence river hydrology and present a potential flood hazard. A bridge, like any fixed structure in a river, can alter flow dynamics and result in localized morphologic changes to the bed and banks of the river. The South Fork Bridge was constructed in a moderately large floodplain and it locally constricts river flow and increases flow velocity, which leads to erosion of the banks, down- cutting of the riverbed, and scouring at the bridge abutments and piers and nearby riverbanks. These processes are ongoing and can be observed as bank erosion, both downstream and upstream of the abutments, and excessive scour beneath the river- right bridge pier. Considering that the South Fork Bridge, if left in place, would continue to constrict river flow and negatively affect the natural hydrologic regime, Alternative 1 would have a local, short- term, adverse impact on hydrologic processes that influence river morphology over the next 10 years. However, when the bridge collapses on its own accord under Alternative 1, near natural river hydrology would be restored upon debris removal, resulting in a local, long- term, minor, beneficial impact on hydrologic processes.

Streambank erosion

NPS Photo

The flood of January 1997 caused excessive scouring of the bridge foundation, especially to the river- right pier. Continued scouring and undermining of the bridge abutments and piers would eventually lead to either partial or full collapse of the abutments, piers, and bridge deck. Failure

could be gradual, lasting over several years as the foundation system degrades, or one flood event could be sufficient to dislodge the structure and initiate a complete failure. Further bridge deterioration over the next 10 years would have a local, short- term, minor, adverse impact on hydrology, floodplains, and water quality because of the continued constricted flows.

When failure does occur, either large bridge sections or smaller abutment and pier segments would collapse into the South Fork Merced River. Depending on the flows at the time of collapse, large pieces of fallen bridge structure could act as a dam, diverting flows to either side of the riverbanks. Smaller segments could also restrict and divert flows, leading to bank erosion or scour. Until the pieces could be removed from the river after collapse, when flow reduces sufficiently, bank erosion would continue. Flows diverted by debris could cause the river to leave the channel and result in localized flooding on either side of the river. Due to the potential for bridge collapse and subsequent erosion and flooding, Alternative 1 would have a local, short- term, moderate, adverse impact on hydrologic processes. However, these adverse impacts would be outweighed by the long- term benefits associated with reducing constriction to streamflows, allowing for improvement of the natural hydrologic regime after the bridge collapses.

Additional impacts to the South Fork Merced River hydrology and floodplain could result from the temporary Bailey bridge. The elevation of the temporary bridge is such that it lies within the 50- year flood flow for the South Fork Merced River. Because the temporary bridge is founded on shallow concrete spread footings, a significant flood event could result in bridge washout and collapse. Such an event, particularly in conjunction with collapse of the original South Fork Bridge, would result in additional scouring of the streambanks and upstream flooding. Therefore, Alternative 1 would result in a local, short- term, moderate, adverse impact on hydrologic processes.

Water quality impacts caused by the South Fork Bridge collapse, whether gradual or sudden, would be temporarily substantial. Water quality would be affected primarily by sediment released into the river from behind and beneath the bridge abutments and by concrete and steel from the bridge structure. Fine- grained sediments would flow farthest downstream and cause the greatest impact to the river by increasing turbidity, while solid structural materials from the bridge (concrete and steel) would constitute less of a water quality impact. In addition, retrieval of the collapsed bridge materials scattered downstream would require use of construction equipment along the river below the bridge. Debris retrieval activities could dislodge sediment from the riverbed and banks. Sediment and debris delivery to the river would continue if the bridge remained and eventually failed. In addition, if the 8- inch gravity- fed sewerline attached to the existing bridge is not re- routed prior to bridge collapse and is ruptured, raw sewage would flow into the South Fork Merced River. Depending upon the river flow during such an event, Alternative 1 would result in a short- term, moderate to major, adverse impact on water quality; therefore, Alternative 1 would represent a short- term, moderate to major, adverse impact to water quality.

Summary of Alternative 1 Impacts

Under Alternative 1, gradual deterioration of the South Fork Bridge would result in continuing local, short- term, minor, adverse impacts to hydrologic processes. The bridge would continue to constrict flows, deepen the riverbed, and narrow the floodplain in this river reach. The river is armored by cobble- to boulder- sized substrate through this reach. Alternative 1 would have short- term, moderate to major, adverse impacts on hydrologic processes and water quality due to the catastrophic collapse of the South Fork Bridge or temporary Bailey bridge, resulting in sewage release and subsequent debris retrieval activities. Over the long term, the collapsed bridge would be removed and a more natural river hydrology would be restored in this area, which would have a local, long- term, minor, beneficial impact on hydrologic processes.

Cumulative Impacts

Cumulative effects to hydrologic processes are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor, in combination with potential effects of Alternative 1.

Alterations to hydrology have occurred through development and use within the South Fork Merced River corridor since settlement of the Wawona area. Examples of actions that have had adverse effects on the hydrologic processes of the South Fork Merced River include placement of riprap; removal of large woody debris; and construction of bridges, impoundments, and buildings. These past actions have adversely impacted hydrologic processes, floodplains, and water quality.

The past, present, and future projects in the South Fork Merced River corridor, considered cumulatively with Alternative 1, would have a local, long- term, minor, beneficial effect on hydrologic processes and water quality. In particular, the implementation of the Merced River Plan, would provide protection and management of land that lies adjacent to the South Fork Merced River. The long- term beneficial effects associated with removal of the collapsed bridge under Alternative 1 would contribute to the beneficial cumulative effects, and largely offset the short- term adverse effects associated with the catastrophic collapse of the bridge.

Conclusions

Alternative 1 would result in local, short- term, minor, adverse impacts to river morphology, floodplains, and water quality because of increased flow velocity and erosion related to constricted flows, as the bridge deteriorates over the next 10 years. Further, Alternative 1 would have short- term, moderate to major, adverse impacts on hydrologic processes and water quality due to the catastrophic collapse of the South Fork Bridge or temporary Bailey bridge, and subsequent sewage release and debris retrieval activities. Over the long term, the collapsed bridge would be removed and a more natural river hydrology would be somewhat restored in this area, which would have a local, long- term, minor, beneficial impact on hydrologic processes.

The past, present, and future projects in the South Fork Merced River corridor, considered cumulatively with Alternative 1, would have a local, long- term, minor, beneficial effect on hydrologic processes and water quality. The long- term beneficial effects associated with removal of the collapsed bridge under Alternative 1 would contribute to the beneficial cumulative effects, and largely offset the short- term adverse effects associated with the catastrophic collapse of the bridge.

Impairment

Alternative 1 would result in short- term, moderate to major, adverse effects to hydrologic processes and water quality associated with catastrophic collapse of the bridge, but local, long-term, minor, beneficial effects associated with the ultimate removal of the bridge. Although the South Fork Merced River system and its associated hydrologic processes are a key resource within Yosemite National Park, the adverse effects of this alternative on river hydrology are primarily localized, temporary in duration, and largely offset by the long- term beneficial effects of ultimate bridge removal. The short- term adverse effects of this alternative would not be considered severe. Therefore, Alternative 1 would not impair hydrologic resources within the South Fork Merced River corridor.

Wetlands

Analysis

In the near term, the South Fork Bridge would remain and the piers and abutments would continue to restrict the free flow of the South Fork Merced River, causing site- specific erosion. The sparse scrub- shrub wetland that has established in the low- flow channel upstream of the existing bridge would continue to provide limited habitat and aesthetic interest. A small patch of sparse scrub- shrub wetland (approximately 200 ft^2) growing on the edge of the low- flow channel immediately downstream of the northernmost pier would be subject to removal by the scouring occurring at the pier base and subsequent advancement downstream. The emergent wetlands and aquatic habitat occupying the bed and banks of Angel Creek, a small tributary drainage downstream of the existing bridge (adjacent to the Wawona Golf Course), would be unaffected by flows in the South Fork Merced River and any influence resulting from the South Fork Bridge.

Over the long term, the South Fork Bridge condition would continue to degrade and the continued scouring would result in the gradual loss of a small wetland area downstream. The result would be local, short- and long- term, negligible, adverse impacts to wetland and aquatic habitat.

Eventually the structure would fail. Bridge collapse would likely occur during a period of high flow and it is assumed that this collapse would occur in the next 10 years. It is also assumed that the utility lines, including the reclaimed waterline and the sewerline, would rupture upon collapse of the bridge. The addition of raw sewage to the river would result in a degradation of water quality and associated function and use as well as the potential for solid sewage debris to become lodged in wetland and riparian vegetation along the riverbanks. Since it is likely the bridge collapse would occur during high- flow conditions and impacts would be dependent on flow, sewage addition would have a local, short- term, moderate, adverse impact to wetlands and aquatic habitat. Collapse of the bridge could result in extensive erosion and the uncontrolled release of debris into the South Fork Merced River; 500 feet downstream is used as the debris transport distance for this assessment. Bridge materials washing downstream could affect wetland, riparian, and aquatic resources during transport by floodwaters (removal of vegetation or habitat from physical contact with debris) or following deposition (covering of vegetation or habitat). In addition, large pieces of concrete, re- bar, stonework, steel deck, and utility lines could dam the river, divert it from its channel, or substantially erode the otherwise stable riverbanks in this river reach. Sudden erosion would threaten the river- right bank downstream of the bridge, where a small amount of erosion has occurred. Diverted river flows and erosion could result in the temporary loss of riparian vegetation along the riverbanks and wetland and aquatic growth within the channel. Bridge debris could be deposited along the river channel and banks downstream and would locally alter hydrologic patterns and the aquatic environment temporarily.

It is assumed that the National Park Service would remove bridge debris, but activities associated with debris removal would not be conducted until low- flow conditions prevailed, which could be several months following a flood event. Adverse effects would result from heavy equipment and debris removal activities and could include soil disturbance, soil compaction, dust generation, vegetation removal, root damage, erosion, and the potential to introduce or spread non- native species. Debris collection activities would release silt and sediments into the water column and could result in the introduction of construction equipment- related pollutants (fuels and lubricants), further degrading the quality of aquatic and wetland habitats. Debris removal would have local, short- term, minor to moderate, adverse effects to approximately 1.5 acres of aquatic habitat.

Failure and subsequent removal of piers and abutments would help restore the free- flowing condition of the South Fork Merced River and return this reach to a more natural state, thereby enhancing its biological integrity. Although the channel of the South Fork Merced River would stabilize and natural recolonization would occur over time, this effect would possibly require 10 or more years. In the interim, erosion and erosion- related effects (e.g., bank instability, sediment deposition into the aquatic environment, uprooting vegetation) would continue. These effects would have a local, long- term, minor to moderate, adverse impact on the aquatic environment. Overall, Alternative 1 would result in a local, short- and long- term, minor to moderate, adverse impact on aquatic resources and riverine areas that provide habitat for a diversity of river- related species downstream of the South Fork Bridge. The extent and quality of wetland, aquatic, and riparian wildlife habitats throughout the South Fork Merced River corridor below Wawona would be unaffected.

Summary of Alternative 1 Impacts

Under Alternative 1, gradual deterioration would result in continuing local, short- term negligible, adverse impacts to wetlands and aquatic habitat in the immediate vicinity. Alternative 1 would result in local, short- and long- term, minor to moderate, adverse impacts to aquatic resources and riverine areas that provide habitat for a diversity of river- related species in the immediate vicinity of the South Fork Bridge due to catastrophic failure. Although natural stabilization of the wetland, riparian, and aquatic community would occur over time, restoration would not be complete for 10 or more years, resulting in a local, long- term, minor, adverse effect on wetland and aquatic habitats.

Cumulative Impacts

Cumulative effects to wetland and aquatic resources are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork River corridor, in combination with potential effects of this alternative.

Wetland and riparian systems of the South Fork Merced River corridor have been altered somewhat by development and visitor activities. The largest of these alterations in the project vicinity was associated with development of the Wawona Golf Course early in the 20th century. In order to provide habitat for turf grasses and a playable surface, the wetlands associated with this site were drained and likely filled. These changes have had negative effects to the size, form, and function of wetland, aquatic, and riparian habitats and related species.

Reasonably foreseeable future actions within the South Fork Merced River corridor are considered to have an overall beneficial effect on wetlands. For example, the Merced River Plan protects river- related natural resources through the application of management elements, including the River Protection Overlay, management zoning, protection and enhancement of Outstandingly Remarkable Values, and implementation of a VERP framework. The *South Fork and Merced Wild and Scenic River Implementation Plan* provides river- related resource protection and management along the common National Park Service/U.S. Forest Service boundary of the South Fork Merced River that occurs approximately three miles upstream of the South Fork Bridge. Exchanging land adjacent to the National Park Service Wilderness Boundary, which is currently owned and actively used as part of the Seventh Day Adventist Camp near Wawona with lands farther from the Wilderness Boundary, along with redesign and construction of the existing and new campground facilities, would further provide for resource preservation, protection, and management activities in the project vicinity.

Cumulative actions would have a long- term, minor, beneficial, cumulative effect on wetlands within the South Fork Merced River due to resource preservation and management focus. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would

have a net local, long- term, minor to moderate, adverse effect on wetland patterns when accounting for the Wawona Golf Course development.

Conclusions

Alternative 1 would result in local, short- and long- term, negligible adverse impacts to wetland and aquatic habitat and riverine resources in the immediate vicinity of the South Fork Bridge due to the gradual deterioration of the structure. Under Alternative 1, catastrophic failure of the bridge would have local, short- and long- term, minor to moderate, adverse impacts to wetland resources. Cumulative present and future actions would have a local, long- term, negligible to minor, beneficial, cumulative effect on wetlands within the South Fork Merced River corridor due to resource protection and management. Cumulative past actions have had a local, long-term, moderate, adverse, cumulative effect on wetlands within the South Fork Merced River corridor due to historic development. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net local, long- term, minor to moderate, adverse effect on wetland patterns.

Impairment

The No Action Alternative would result in a local, negligible to minor, adverse impact to wetland and aquatic resources and riverine areas that provide habitat for a diversity of river- related species in the vicinity of the South Fork Bridge. The effect of this alternative on wetland resources would be localized and would not be considered severe. The extent and quality of wetland, riparian, and other riverine habitats throughout the remainder of the South Fork Merced River corridor would remain unaffected. Therefore, Alternative 1 would not impair wetland resources.

Vegetation

Analysis

In the short term, the South Fork Bridge would remain and the piers and abutments would continue to restrict the free flow of the South Fork Merced River, causing site- specific erosion. Over the long term, the South Fork Bridge condition would continue to degrade and eventually the structure would fail. Bridge collapse would likely occur during a period of high flow, and it is assumed that this collapse would occur in the next 10 years. Collapse of the bridge could result in extensive erosion and the uncontrolled release of debris into the South Fork Merced River. Bridge materials washing downstream as well as raw sewage from the ruptured sewerline could affect riparian vegetation during transport by floodwaters (removal of vegetation or habitat from physical contact with debris) or following deposition (covering of vegetation or habitat). In addition, large pieces of concrete, re- bar, stonework, steel deck, and utility lines could dam the river, divert it from its channel, or substantially erode the otherwise stable riverbanks in this river reach. Sudden erosion would threaten the river- right bank downstream of the bridge, where a small amount of erosion has occurred. On this bank, several white alder, incense- cedar, and ponderosa pine trees would be lost due to erosion undermining the trees or by the direct impact of bridge debris. Likewise, white alder and incense- cedar trees established on the river- left bank adjacent to the bridge deck and abutment would likely also be lost, as described above. This would have local, short- and long- term, negligible to minor, adverse impacts to vegetation in the immediate vicinity of the South Fork Bridge.

It is assumed that the National Park Service would remove bridge debris, but activities associated with debris removal would not be conducted until low- flow conditions prevailed, which could be several months following a flood event. Adverse effects to vegetation could result from removal or trimming trees or shrubs to gain heavy equipment access to the river, soil disturbance, soil

compaction, root damage, and the potential to introduce or spread non- native species. Debris removal would have local, short- term, negligible to minor, adverse effects to native vegetation.

Failure and subsequent removal of piers and abutments would help restore the free- flowing condition of the South Fork Merced River and return this reach to a more natural state, thereby enhancing its biological integrity. Although the channel of the South Fork Merced River would stabilize and natural recolonization would occur over time, this effect would possibly require 10 or more years. In the interim, erosion and erosion- related effects (e.g., bank instability and undermining streamside vegetation) would continue. These effects would have a local, long- term, negligible, adverse impact on vegetation. Overall, Alternative 1 would result in a local, negligible, adverse impact to vegetation in the immediate vicinity of the South Fork Bridge. The extent and quality of riparian, wetland, aquatic, and upland vegetation throughout the South Fork Merced River corridor below Wawona would be unaffected.

Summary of Alternative 1 Impacts

Alternative 1 would result in local, short- and long- term, negligible to minor, adverse impacts to vegetation in the immediate vicinity of the South Fork Bridge.

Cumulative Impacts

Cumulative effects to vegetation resources are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork River corridor in combination with potential effects of this alternative.

Vegetation in the South Fork Merced River corridor has been substantially altered by development and visitor activities. These changes have had negative effects to the size, form, and function of upland, riparian, wetland, and aquatic vegetation communities and related wildlife species.

Reasonably foreseeable future actions within the South Fork Merced River corridor are considered to have an overall net benefit to vegetation. For example, the Merced River Plan protects river- related natural resources through the application of management elements, including the River Protection Overlay, management zoning, protection and enhancement of Outstandingly Remarkable Values, and implementation of a VERP framework. The *South Fork and Merced Wild and Scenic River Implementation Plan* provides river- related resource protection and management along the common National Park Service/U.S. Forest Service boundary of the South Fork Merced River that occurs approximately three miles upstream of the South Fork Bridge. The proposed land exchange with the Seventh Day Adventists would provide for restoration and reclamation of disturbed camp lands adjacent to a National Park Service Wilderness Boundary in exchange for moving camp facilities to a slightly larger parcel of less environmentally sensitive National Park Service property located west of the existing camp. This would result in an overall enhancement of vegetative resources in environmentally sensitive areas and a degradation of land in association with the new camp facilities. The redesign and construction of the existing and new campground facilities at Wawona would further provide for resource preservation, protection, and management activities in the South Fork Merced River drainage in the project vicinity. At the South Entrance, giant sequoia habitat would be restored in the Mariposa Grove of Giant Sequoias.

Cumulative actions would have a long- term, minor, beneficial, cumulative effect on vegetation within the South Fork Merced River due to resource preservation and management focus. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net local, long- term, negligible to minor, beneficial effect on vegetation patterns.

Conclusions

Alternative 1 would result in local, short- and long- term, negligible, adverse impacts to vegetation in the immediate vicinity of the South Fork Bridge. Cumulative actions would have a local, long-term, minor, beneficial, cumulative effect on vegetation resources within the South Fork Merced River corridor due to resource protection and management. Cumulative impacts would have a local, long- term, moderate, adverse, cumulative effect on vegetation resources within the South Fork Merced River corridor due to historic development. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net local, long- term, negligible to minor, beneficial effect on vegetation patterns.

Impairment

The No Action Alternative would result in a local, short- and long- term, negligible, adverse impact to vegetation in the immediate vicinity of the South Fork Bridge. The effect of this alternative on vegetation resources would be localized and would not be considered severe. The extent and quality of vegetation, including upland, riparian, wetland, and aquatic types throughout the remainder of the South Fork Merced River corridor would remain unaffected. Therefore, Alternative 1 would not impair vegetation resources.

Wildlife

Analysis

In the short term, the South Fork Bridge would remain and the piers and abutments would continue to restrict the free flow of the South Fork Merced River, causing site- specific erosion. The scour pools formed at the base of the piers would continue to provide a small amount of deeper water and protected habitat for aquatic organisms in a reach of river that is largely riffles and shallow runs. Aquatic mosses and a sparse stand of emergent scrub- shrub wetland would provide additional habitat structure within the riverbed. A narrow band of riparian trees and shrubs would provide wildlife habitat near the bridge abutments (roosting, perch, and nest sites), and sparsely vegetated upland habitats adjacent to the river would provide site- specific wildlife habitat diversity.

Over the long term, the South Fork Bridge condition would continue to degrade and eventually the structure would fail. Bridge collapse would likely occur during a period of high flow and it is assumed that this collapse would occur in the next 10 years. A sudden collapse of the bridge could cause raw sewage to enter the river affecting fish, other aquatic organisms, as well as other species that use the South Fork Merced River. Collapse of the bridge could result in extensive erosion and the uncontrolled release of debris into the South Fork Merced River that could temporarily affect aquatic resources, fish, and wildlife. Bridge debris could adversely affect large trees and the banks and channel of the South Fork Merced River, which provide habitat for species such as raptors, small mammals, and fish. Large pieces of concrete, re- bar, stonework, steel deck, and utility lines could dam the river, divert the river from its channel, or substantially erode the otherwise stable riverbanks in this area (one minor area of erosion was noted on the river- right bank). Sudden erosion would threaten several trees, including white alder, incense- cedar, and ponderosa pine that represent potential nest and perch locations for species of birds and small mammals such as squirrels. Suspended sediments would temporarily reduce dissolved oxygen levels, which could affect respiration of aquatic invertebrates and fish. Large debris would temporarily modify the channel and substrate of the South Fork Merced River at this location, which could result in a negligible, adverse impact on fish passage.

It is assumed that the National Park Service would remove bridge debris, but activities associated with debris removal would not be conducted until low flow conditions prevailed, which could be several months following a flood event resulting in bridge collapse. Adverse effects would result from heavy equipment and debris removal activities and could include soil disturbance, soil compaction, dust generation (e.g., potential adverse impacts to invertebrate respiration), vegetation removal (e.g., potential adverse impacts to nest and perch sites), and introduction of construction- related pollutants (e.g., temporary degradation of fisheries habitat). The amount of sediment potentially released during the retrieval of bridge components would be minor and would not cause turbidity or sedimentation sufficient to adversely affect the fishery resource downstream of the activities. Debris removal and sewage release would have regional, short-term, negligible to minor, adverse effects to wildlife. Alternative 1 would result in a local, short-term, moderate, adverse impact to wildlife in the immediate vicinity of the South Fork Bridge.

Failure and subsequent removal of piers and abutments would help restore the free- flowing condition of the South Fork Merced River and return this reach to a more natural state, thereby enhancing biological integrity and the fishery habitat. Over time, the channel of the South Fork Merced River would stabilize, natural recolonization would occur, and wildlife habitats would normalize. The scour pools currently present at the base of the piers would fill with riverbed materials, particularly cobble. Local wildlife would adjust to the riverbed stabilization process, although the effect could occur over 10 or more years. Overall, Alternative 1 would result in a local, short- term, minor to moderate, adverse impact to wildlife in the immediate vicinity of the South Fork Bridge. Long- term effects of Alternative 1 on wildlife would be local, negligible to minor, and beneficial. The extent and quality of habitat for a diversity of river- related wildlife species throughout the South Fork Merced River would be unaffected.

Summary of Alternative 1 Impacts

Alternative 1 would result in a local, short- term, moderate, adverse impact to wildlife in the immediate vicinity of the South Fork Bridge. The regional impacts would be short term, negligible to minor, and adverse. Long- term effects of Alternative 1 on wildlife would be local, negligible to minor, and beneficial.

Cumulative Impacts

Cumulative effects on wildlife are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor in combination with potential effects of this alternative.

Wildlife communities have been manipulated from early in park history. Wildlife of the region was affected due to logging, fire suppression, rangeland clearing, livestock grazing, mining, draining, damming, water diversion, and the introduction of non- native species. Fur- bearing mammals and animals considered dangerous predators (e.g., mountain lion) were trapped or controlled through the 1920s, and black bears were artificially fed as a tourist attraction until 1940. Naturally occurring wildland fires that are generally beneficial for wildlife habitat, were routinely suppressed until 1972 (Wuerthner 1994). Historic and current human activities influencing wildlife include recreational use, roads and trails, bridge construction, diversion dams, reservoirs, pipelines, riprap, facilities, campgrounds, and other recreational features.

Reasonably foreseeable future actions within the South Fork Merced River corridor are considered to have an overall beneficial effect on wildlife. For example, the Merced River Plan protects river- related natural resources through the application of management elements, including the River Protection Overlay, management zoning, protection and enhancement of Outstandingly Remarkable Values, and implementation of a VERP framework. The *South Fork and Merced Wild and Scenic River Implementation Plan* provides river- related resource protection

and management along the common National Park Service/U. S. Forest Service boundary of the South Fork Merced River that occurs approximately three miles upstream of the South Fork Bridge. The land exchange with the Seventh Day Adventists would enhance wildlife protection and habitat restoration adjacent to a National Park Service Wilderness Boundary, while degrading the wildlife habitat on lands where camp facilities would be relocated. The redesign and construction of the existing and new campground facilities at Wawona would further provide for resource preservation, protection, and management activities in the South Fork Merced River drainage in the project vicinity. However, expansion of campgrounds has the potential to adversely affect local wildlife.

Cumulative actions would have a local, long- term, minor to moderate, beneficial, cumulative effect on wildlife within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net local, long- term, minor to moderate, beneficial effect on wildlife patterns.

Conclusions

Alternative 1 would result in a local, short- term, minor to moderate, adverse impact to wildlife in the immediate vicinity of the South Fork Bridge, and a regional, short- term, negligible to minor, adverse impact on wildlife downstream from the bridge. Long- term effects of Alternative 1 on wildlife would be local, negligible to minor, and beneficial. Cumulative actions would have a local, long- term, minor to moderate, beneficial, cumulative effect on wildlife within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net long- term, minor to moderate, beneficial effect on wildlife patterns.

Impairment

The No Action Alternative would result in a local, short- term, minor to moderate, adverse impact to wildlife and wildlife habitat for a diversity of river- related species in the immediate vicinity of the South Fork Bridge. Long- term effects of Alternative 1 on wildlife would be local, negligible to minor, and beneficial. Although the South Fork Merced River and its related wildlife are key resources within the southern portion of Yosemite National Park, the adverse effect of this alternative on wildlife would be localized, short term, and would not be considered severe. The extent and quality of wildlife and wildlife habitat for a diversity of river- related species throughout the remainder of the South Fork Merced River reach would remain unaffected. Therefore, Alternative 1 would not impair wildlife resources.

Special-Status Species

Analysis

Of the special- status species known or likely to occur in the immediate vicinity of the South Fork Bridge, the Wawona riffle beetle and nine species of bats have been documented in the immediate vicinity (see Chapter III and Appendix C). However, suitable habitat for the other special- status species considered in Chapter III is present.

In the short term, the South Fork Bridge would remain and the piers and abutments would continue to restrict the free flow of the South Fork Merced River, causing site- specific erosion. The aquatic habitat of the riverbed and the sparse scrub- shrub wetland community that has established within the low- flow channel would continue to provide habitat for special- status species, particularly the Wawona riffle beetle, California red- legged frog, the northwestern and southwestern pond turtles, and the foothill yellow- legged frog. While standing, the South Fork

Bridge and the temporary Bailey bridge could provide roosts for species of bats, in particular. Over the long term, the South Fork Bridge condition would continue to degrade and eventually the structure would fail. Bridge collapse would likely occur during a period of high flow and it is assumed that this collapse would occur in the next 10 years. Collapse of the bridge could result in extensive erosion and the uncontrolled release of debris and raw sewage into the South Fork Merced River. Bridge materials and raw sewage washing downstream could temporarily affect special- status species. For example, bridge debris could bury or otherwise affect the aquatic habitat that supports the Wawona riffle beetle's life cycle (moss- covered cobbles) and/or potential habitat for the California red- legged frog, northwestern and southwestern pond turtles, harlequin duck, or the foothill yellow- legged frog. Sudden riverbank erosion would likely remove several short- stature white alder, incense- cedar, and ponderosa pine trees that could serve as perches for special- status raptor species (e.g., bald eagles, peregrine falcon, great gray owl, and California spotted owl) perch/nest sites for other bird species (e.g., little willow flycatcher, Vaux's swift, olive- sided flycatcher, black swift, hermit warbler, Lewis' woodpecker, rufous hummingbird, American dipper, white- headed woodpecker, and Nuttall's woodpecker), and mammals such as the Pacific fisher. Riverbank erosion could also remove potential habitat for special- status species of plants, including the Small's southern clarkia, Rawson's flaming trumpet, and the Yosemite lewisia. Similarly, changes in the river hydrology could alter suitable habitat for these plants. Suspended sediments or raw sewage would temporarily reduce dissolved oxygen levels, or change other water quality parameters, which could affect respiration, life cycles, or cover eggs of aquatic species such as the Wawona riffle beetle, California red- legged frog, northwestern and southwestern pond turtles, or the foothill yellow- legged frog. Bat roosting habitat would also be destroyed in a sudden collapse of the bridge.

It is assumed that the National Park Service would remove bridge debris, but activities associated with debris removal would not be conducted until low- flow conditions prevailed, which could be several months following a flood event and bridge collapse. Adverse effects would result from heavy equipment and debris removal activities and could include soil disturbance, soil compaction, dust generation, vegetation removal (e.g., potential adverse impacts to nest and perch sites for special- status raptors), root damage, erosion, introduction of construction-related pollutants (e.g., temporary degradation of habitat for aquatic species), and the potential to introduce or spread non- native species. The amount of sediment potentially released during the retrieval is expected to be minor and would not cause turbidity or sedimentation sufficient to adversely affect aquatic resources for special- status species downstream of the retrieval area. Bridge collapse and debris removal would have local, short- term, moderate, adverse effects to approximately 1.5 acres of aquatic habitat that likely supports the Wawona riffle beetle.

Failure and subsequent removal of piers and abutments would help restore the free- flowing condition of the South Fork Merced River and return this reach to a more natural state, thereby enhancing its biological integrity and habitat for aquatic special- status species such as those noted previously. Over time, the channel and bed of the South Fork Merced River would stabilize, natural recolonization of riverbed substrates would occur, and habitats would normalize. Although this effect likely would not be realized for 10 or more years, local special-status species such as raptors would adjust. Potential effects to the Wawona riffle beetle would be more pronounced due to the restricted riverbed habitat and short life span. Some roosting habitat for bats may be lost due to the collapse of the South Fork Bridge. Eventual bridge failure and the release of sediment and debris would have a short- term effect on the South Fork Merced River and could temporarily disrupt individual bats. Overall, Alternative 1 would result in a local, short-term, moderate, adverse impact to special- status species in the immediate vicinity of the South Fork Bridge. Downstream of the bridge the effects would gradually diminish resulting in a local, short- term, minor to moderate, adverse impact to special species downstream. Long- term effects of Alternative 1 on special- status species would be local, negligible to minor, and beneficial. The extent and quality of river- related habitats and species throughout the South Fork Merced River corridor would be unaffected.

Summary of Alternative 1 Impacts

Alternative 1 would result in a local, short- term, moderate, adverse impact to special- status species in the immediate vicinity of the South Fork Bridge, and a local, short- term, minor to moderate, adverse impact to special- status species downstream from the bridge. Long- term effects of Alternative 1 on special- status species would be local, negligible to minor, and beneficial.

Cumulative Impacts

Cumulative effects to special- status species are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork River corridor in combination with potential effects of this alternative.

Natural habitats, including those supporting the Wawona riffle beetle and other special- status aquatic species, the nine species of special- status bats, the numerous special- status birds, and special- status plants, have been manipulated almost since the inception of the park. Regional wildlife and vegetation patterns have been historically affected by logging, fire suppression, rangeland clearing, livestock grazing, mining, draining, damming, water diversions, and the introduction of non- native species. Historic and current human activities, influencing the special- status species include recreational use, roads and trails, bridge construction, diversion dams, reservoirs, pipelines, riprap, facilities, campgrounds, and other recreational features.

Reasonably foreseeable future actions with the South Fork Merced River corridor are considered to have an overall beneficial effect on special- status species. For example, the Merced River Plan protects river- related natural resources through the application of management elements, including the River Protection Overlay, management zoning, protection and enhancement of Outstandingly Remarkable Values, and implementation of a VERP framework. The *South Fork and Merced Wild and Scenic River Implementation Plan* provides river- related resource protection and management along the common National Park Service/U.S. Forest Service boundary of the South Fork Merced River that occurs approximately three miles upstream of the South Fork Bridge. The land exchange with the Seventh Day Adventists would enhance special- status protection and habitat restoration adjacent to a National Park Service Wilderness Boundary, while degrading the habitat on lands where camp facilities would be relocated. The redesign and construction of the existing and new campground facilities at Wawona would further provide for resource preservation, protection, and management activities in the South Fork Merced River drainage in the project vicinity. However, expansion of campgrounds and development of employee housing have the potential to adversely affect special- status species.

Cumulative actions would have a local, long- term, minor, beneficial cumulative effect on special-status species within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net local, long- term, minor, beneficial effect on special- status species.

Conclusions

Alternative 1 would result in local, short- term, moderate, adverse impacts to special- status species and aquatic habitat in the immediate vicinity of the South Fork Bridge. Long- term effects of Alternative 1 on special- status species would be local, negligible to minor, and beneficial. Cumulative actions would have a local, long- term, minor, beneficial cumulative effect on special-status species within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net local, long- term, minor, beneficial effect on special- status species.

Impairment

The No Action Alternative would result in a local, short- term, negligible to minor, adverse impact to special- status species that occur in the vicinity of the South Fork Bridge. Long- term effects of Alternative 1 on special- status species would be local, minor, and beneficial. The adverse effect of this alternative on special- status species would be localized and would not be considered severe. The extent and quality of aquatic, wetland, riparian, and other riverine habitats throughout the remainder of the South Fork Merced River corridor reach would remain unaffected. Therefore, Alternative 1 would not impair special- status species.

Air Quality

Analysis

Under Alternative 1, automobile and recreational vehicle traffic would continue to be slowed due to the speed and size limitations of the existing temporary Bailey bridge. This can cause negligible to minor, short- term, adverse impacts on local air quality, depending on the time of year (i.e., more traffic exists during the summer months, causing more congestion), meteorological conditions (e.g., wind speed, wind direction), and the type of vehicles (automobile versus recreational vehicle) crossing the temporary bridge.

Over the long term, the South Fork Bridge condition would continue to degrade, eventually leading to a failure of all or a portion of the bridge, and downstream transport of bridge materials. Further bridge deterioration would have a negligible adverse effect on air quality until collapse occurred. Bridge debris may be deposited in the river channel and along the banks, and would require removal activities. Effects would be primarily related to the use of equipment, dust, and vehicle trips to and from the area. The South Fork Bridge is located in state nonattainment areas for PM- 10 and ozone, and a national attainment area for ozone (currently, national PM- 10 attainment or nonattainment status is unclassified in this area). Monitoring data from Wawona and Jerseydale (approximately 12 miles west of Wawona) indicate exceedances of state and national standards for ozone have occurred near the project site. PM- 10 is monitored at the Yosemite Village Visitor Center, and exceedances of the state and national (only on one occasion in the last eight years) standards have been observed. Debris removal activities would temporarily affect pollutant concentrations in the vicinity of South Fork Bridge, but would not affect the attainment area status. Removal activities and vehicle traffic over paved surfaces heavily laden with earthen materials would generate substantial amounts of dust, including PM- 10 and PM- 2.5, primarily from fugitive sources (i.e., emissions released by means other than through a stack or tailpipe). Dust emissions would vary from day to day, depending on the level and type of activity, silt content of the soil, and the weather. These impacts would be mitigated through practices also described for the Preferred Alternative of this environmental assessment. The debris removal activities may also result in short- term traffic congestion at the temporary Bailey bridge, with associated increased vehicle emissions.

Alternative 1 would result in tailpipe emissions associated with use of mobile debris removal equipment, construction- worker commute trips, truck trips to haul bridge materials from the site to appropriate storage areas or recycling facilities, and traffic congestion. These emissions could affect local air quality, but adverse impacts would be local, short term, and negligible. The debris removal activities would generate emissions of ozone precursors and carbon monoxide (criteria air pollutant emissions), as well as toxic air contaminants, from the use of diesel- powered equipment. Toxic air contaminants are less pervasive in the atmosphere than criteria air pollutants, but they are linked to short- term (acute) or long- term (chronic or carcinogenic) adverse human health effects. Toxic air contaminants do not have corresponding ambient air quality standards. However, the limited duration of debris removal activities would limit the

potential for diesel particulates to adversely affect local air quality, resulting in local, short- term, minor, adverse impacts.

Summary of Alternative 1 Impacts

Further bridge deterioration would have a local, negligible to minor, adverse effect on air quality because of traffic congestion at the temporary Bailey bridge. Bridge debris removal, in response to an eventual, uncontrolled collapse of a portion of the South Fork Bridge, and traffic congestion at the temporary Bailey bridge, would result in local, short- term, negligible to minor, adverse impacts to air quality. However, the designated attainment status for PM- 10 or ozone would remain unchanged. There would be no long- term effect on air quality under this alternative.

Cumulative Impacts

Cumulative effects to air quality are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor and Yosemite Valley with potential effects of this alternative. The general population growth in the state of California and management plans and projects involving the South Fork Merced River corridor and Yosemite Valley could cumulatively affect air quality.

Since 1950, the population of California has tripled, and the rate of increase in vehicle- miles-traveled has increased six- fold (NPS 2003). Air quality conditions within the park have been influenced by this population growth and associated emissions from industrial, commercial, and vehicular sources in upwind areas. Since the 1970s, emissions sources operating within the park, as well as California, have been subject to local stationary- source controls and state and federal mobile- source controls. With the passage of time, such controls have been applied to an increasing number of sources, and the associated requirements have become dramatically more stringent and complex.

Reasonably foreseeable future actions proposed in Yosemite National Park and near the South Fork Bridge could have beneficial or adverse impacts on air quality. Construction activities associated with the proposed South Entrance/Mariposa Grove Site Planning, employee housing proposed in the *Yosemite Valley Plan*, and the Wawona Campground Improvement would have short- term, localized, adverse effects on air quality from fugitive dust, criteria pollutant, and toxic air contaminant emissions from the operation of construction equipment. Wawona Campground improvements would increase the number of visitors and result in long- term, localized, adverse effects on air quality from increased vehicle emissions and the use of campfires. The *Yosemite Valley Plan* identifies potential relocation of employees to Wawona resulting in long- term, localized, adverse effects on air quality from increased vehicle emissions. However, projects such as YARTS could have a net beneficial effect on air quality by improving the attractiveness of alternative modes of transportation and thereby reducing private automobile trips throughout the park. The general goal of this project is to increase transportation options and reduce reliance on automobiles, relieving congestion and associated increased stationary emissions as a result of idling vehicles, having a long- term, beneficial effect on air quality.

Although cumulative growth in the region would tend to adversely affect air quality, implementation of ongoing state and federal mobile- source control programs would reduce this impact to a degree. With respect to particulate matter, conditions near the South Fork Bridge would be determined by both regional and local sources, and could be beneficial or adverse. Considered with the adverse impacts associated with regional air quality influences, the cumulative projects would have a local, long- term, minor beneficial effect on air quality near the South Fork Bridge. The short- term adverse effects associated with potential bridge debris removal activities would not offset the long- term, beneficial effects of the cumulative projects.

Conclusions

Under Alternative 1, bridge debris removal, in response to an eventual, uncontrolled collapse of a portion of the South Fork Bridge, and traffic congestion at the temporary Bailey bridge, could result in regional and local, short- term, negligible to minor, adverse impacts to air quality. However, the designated attainment status for PM- 10 or ozone would remain unchanged. There would be no long- term effect on air quality under this alternative.

Alternative 1 and the cumulative projects would result in local, long- term, minor, beneficial impacts on air quality near the South Fork Bridge. The localized, short- term, adverse effects associated with potential bridge debris removal activities would not offset the long- term, beneficial effects of the cumulative projects.

Impairment

The No Action Alternative would result in a local, short- term, negligible to minor, adverse impact to air quality. Air quality impacts would not be considered severe and would not impair park resources or values.

Noise

Analysis

At the South Fork Bridge site, automobile and recreational vehicle traffic would continue to be slowed due to the speed and size limitations of the existing temporary Bailey bridge. This can cause negligible to minor, short- term, adverse impacts on the local ambient noise environment, depending on the time of year (i.e., more traffic exists during the summer months, causing more congestion), meteorological conditions (e.g., wind speed, wind direction), and the type of vehicles (automobile versus recreational vehicle) crossing the temporary bridge.

Under Alternative 1, the gradual deterioration of the bridge over time would have no effect on the ambient noise levels of the area. However, bridge debris removal activities, resulting from the eventual, uncontrolled collapse of the South Fork Bridge would have local, short- term, minor to moderate, adverse impacts on noise. Effects would be primarily related to bridge debris removal (e.g., crane operation) and debris haul trips, which would also raise ambient noise levels along haul routes. Operation of heavy equipment at the site during retrieval could generate substantial amounts of noise and would occur within close proximity to sensitive receptors, including the Wawona Campground and picnic areas, Wawona Store, Wawona Hotel, the school in Wawona, Seventh Day Adventist Church camp, Pioneer Yosemite History Center, and the Wawona Golf Course. Table IV- 1 provides typical noise levels generated by construction equipment.

Noise near the South Fork Bridge would vary depending upon a number of factors, such as the number and types of equipment in operation on a given day, usage rates, the level of background noise in the area, and the distance between sensitive uses and the construction site.

The specific mix of equipment to be used in bridge debris removal, which could include bridge cutting and removal of any portion left standing, is unknown, but may include the use of cranes, excavators, backhoes, skid steer loaders, trucks, graders, jack hammers, and concrete saws. Noise levels would decrease by about 6 dbA with each doubling of distance from the site (i.e., noise levels from crane use would be in the range of 83 to 88 dBA 50 feet from the site, and about 77 to 82 dBA 100 feet from the site). Equipment use would have local, short- term, minor to moderate, adverse impacts on noise.

Over the long term, the acoustical environment in the vicinity of the South Fork Bridge would be shaped largely by natural sources of sound (e.g., rushing water and wind), interspersed with human- caused sources of noise (e.g., motor vehicles, talking and yelling, and aircraft).

Table IV-1. Typical Noise Levels Associated with Construction Equipment

Equipment	Typical Noise Level (dBA) 50 Feet From the Source
Air Compressor	81
Backhoe	80
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	81
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	85
Paver	89
Pneumatic Tool	85
Pump	76
Rock Drill	98
Roller	74
Saw	76
Scraper	89
Truck	88

Summary of Alternative 1 Impacts

Bridge debris removal activities, related to the eventual, uncontrolled bridge failure, and traffic congestion at the temporary Bailey bridge, would result in local, short- term, negligible to moderate, adverse impacts to the ambient noise environment. However, over the long term, the ambient noise environment near the South Fork Bridge would be shaped largely by natural sources of sound interspersed with human- caused sources of noise.

Cumulative Impacts

Cumulative effects to noise are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor and Yosemite Valley with potential effects of this alternative.

The Merced River Plan and the *South Fork and Merced Wild and Scenic River Implementation Plan* were developed to protect the river- related natural and cultural resources. The purpose of the Merced River Plan is to protect and enhance the Outstandingly Remarkable Values and free-flowing condition of the river for the benefit and enjoyment of future generations, which would benefit the ambient noise environment near the South Fork Bridge. The *South Fork and Merced Wild and Scenic River Implementation Plan* provides river- related resource protection and management along the three- mile reach upstream of the South Fork Bridge that serves as a

boundary to National Park Service and U.S. Forest Service lands. This plan would also benefit the ambient noise environment near the project site.

Reasonably foreseeable future actions proposed in Yosemite National Park and near the South Fork Bridge could have beneficial or adverse impacts on noise. Construction activities associated with the South Entrance/Mariposa Grove Site Planning, South Fork Merced River Bridges Replacement, employee housing at Wawona proposed in the *Yosemite Valley Plan*, and the Wawona Campground improvement would have short- term, localized, adverse effects on noise from the operation of construction equipment. However, projects such as YARTS could have a net beneficial effect on the ambient noise environment by improving the attractiveness of alternative modes of transportation, and thereby reducing private automobile trips throughout the park. The general goal of this project is to relieve congestion and to provide for alternative means of transportation, having a long- term, beneficial effect on noise. To the extent that transportation- related projects would replace automobile trips with bus trips, the anticipated beneficial effect would depend on ridership levels (and the corresponding number of automobile trips that would be avoided) and the technology selected for the buses.

The gradual increase in annual visitation to the park would likely offset the beneficial effects of cumulative actions that would tend to reduce vehicle trips and their associated noise. In the short term, Alternative 1 and other cumulative actions would, therefore, contribute to the local, long-term, minor, adverse, cumulative effect on the noise environment near the South Fork Bridge.

Conclusions

Bridge debris removal, in response to an eventual collapse of all or a portion of the South Fork Bridge, and traffic congestion at the temporary Bailey bridge, would result in local, short- term, negligible to moderate, adverse impacts on noise. However, over the long term, the ambient noise environment near the South Fork Bridge would be shaped largely by natural sources of sound interspersed with human- caused sources of noise.

The assumed gradual increase in annual visitation to the park would likely offset the beneficial effects of cumulative actions that would tend to reduce vehicle trips and their associated noise. Alternative 1 would, therefore, contribute to the local, long- term, minor, adverse, cumulative effect on the noise environment near the South Fork Bridge.

Impairment

The No Action Alternative would result in a local, short- term, negligible to minor, adverse impact from noise. Noise impacts would not be considered severe and would not impair park resources or values.

Cultural Resources

Archeological Resources

Analysis

Under Alternative 1, there would be no change in management and treatment of archeological sites in the South Fork Bridge project area. The South Fork Bridge would gradually deteriorate over the ensuing 10- year period, and the piers and abutments would continue to restrict the free flow of the South Fork Merced River, causing site- specific erosion of soil from the banks. Further bridge deterioration would have a minor to moderate, adverse effect until collapse, which would likely occur during a period of high flow. Bridge debris generated during the collapse could dam the river, divert the river from its channel, or substantially erode the otherwise stable riverbanks in this area, particularly the river- right (north) bank, which could unearth sensitive prehistoric or historic archeological materials associated with site CA- MRP/171/H. Collapse of the South Fork Bridge would result in long- term, moderate, adverse impacts to archeological resources.

Although the banks of the South Fork Merced River would stabilize over time, this effect likely would not be realized for 10 or more years. In the interim, bank erosion and erosion- related effects that could potentially affect the archeological resource located adjacent to the north bank of the South Fork Merced River, would continue. Activities associated with removal of bridge debris are not anticipated to involve earth moving and grading that could affect archeological resources. The evidence of thousands of years of human occupation, reflected in the large number of archeological sites, throughout the remainder of the South Fork Merced River corridor would be unaffected.

Summary of Alternative 1 Impacts

Further bridge deterioration and possible collapse has the potential to have a long- term, minor to moderate, adverse effect on archeological resources in the vicinity of the South Fork Bridge. Since the intensity of impacts would depend on the nature, location, and extent of disturbance as well as the quantity and data potential of the archeological site affected, it is difficult to determine the intensities of those impacts. Any site- specific planning and compliance actions would be performed in accordance with stipulations in the park's 1999 Programmatic Agreement.

Cumulative Impacts

Cumulative impacts to archeological resources are based on analysis of past, present, and reasonably foreseeable future actions in the Wawona area, in combination with potential effects of this alternative.

In general, any archeological resources within the Wawona area are the result of thousands of years of human occupation. Development of facilities within the area has disturbed or destroyed numerous archeological resources and compromised the integrity of others, which has led to an adverse cumulative effect.

Reasonably foreseeable future actions proposed in the region that could have an adverse cumulative effect on archeological resources in the Wawona area include development- related projects, such as the proposed employee housing development, the Wawona Campground improvements, and the land exchange and subsequent disturbance of land for new facilities associated with the Seventh Day Adventist camp. Primary disturbance and ecological restoration associated with these projects could disturb individual archeological resources along the South

Fork Merced River, an archeologically sensitive area. The National Park Service would follow guidelines of the 1999 Programmatic Agreement and would avoid adverse effects to archeological resources to the greatest extent feasible.

Implementation of projects allowed under the Merced River Plan would have local, long- term, adverse, cumulative effects on archeological resources, although these projects would be subject to specific mitigation measures.

The Merced River Plan provides a framework for decision- making on future management actions within the South Fork River corridor through the application of a consistent set of decision- making criteria and considerations composed of seven management elements (see Chapter V, Merced Wild and Scenic River). The Merced River Plan designates cultural resources as an Outstandingly Remarkable Value for this reach of the river. Therefore, while there may be localized disturbances to archeological resources, the Outstandingly Remarkable Value must be protected and enhanced.

The cumulative projects within and in the vicinity of the South Fork Bridge, when considered with Alternative 1, would result in local, long- term, negligible, beneficial impacts on archeological resources due to protection and enhancement of the Outstandingly Remarkable Value.

The Merced River Plan designates cultural resources as an Outstandingly Remarkable Value for this reach of the South Fork Merced River. Therefore, while there may be localized disturbances to archeological resources, the Outstandingly Remarkable Value must be protected and enhanced.

The cumulative projects within and in the vicinity of the South Fork Bridge, when considered with Alternative 1, would result in long- term, negligible, beneficial impacts on archeological resources due to the protection and enhancement of the Outstandingly Remarkable Value.

Section 106 Summary. Alternative 1 does not propose a federal undertaking as described in 36 CFR 800.16(y). Therefore, there is no potential to cause effects on National Register of Historic Places- eligible archeological resources.

Conclusions

There would be no change in the treatment and management of archeological resources in the South Fork Bridge project area as a result of Alternative 1. Bridge collapse and subsequent bank erosion that could occur has the potential to have a long- term, adverse effect on archeological resources in the vicinity. Due to the existence of a specific site within the project area, planning and compliance actions would be performed in accordance with stipulations in the park's 1999 Programmatic Agreement. Alternative 1 and the cumulative projects within and in the vicinity of the South Fork Merced River would result in a local, long- term, negligible, beneficial impact on archeological resources.

Impairment

Although archeological sites along the South Fork Merced River are key cultural resources within the Wawona area, the effect of Alternative 1 on archeological resources would primarily be localized, and the effect would not be considered severe. In addition, Alternative 1 would not change the treatment and management of any of these archeological resources. Sites throughout the remainder of the Wawona area would be unaffected. Therefore, Alternative 1 would not impair park resources or values.

Ethnography

Analysis

Under Alternative 1, there would be no change in the management and treatment of ethnographic resources in the Wawona area. Further bridge deterioration and eventual collapse would likely occur during a period of high flow. Bridge debris could dam the river, divert the river from its channel, or substantially erode the otherwise stable riverbanks in this area and remove vegetation gathered by American Indian people. Bridge materials washing downstream could affect ethnographically important vegetation during transport by floodwaters (removal of ethnographically important vegetation from physical contact with debris) or following deposition (covering of ethnographically important vegetation). Other ethnographic resources that may be affected (e.g., burials, village sites, etc.) are discussed under the archeological resource analysis. Important plant species observed in the vicinity of the South Fork Bridge included willows, sedges, grasses, and mosses, among other species.

It is assumed that the National Park Service would remove bridge debris, but activities associated with debris removal would not be conducted until low- flow conditions prevailed, which could be several months following a flood event. Debris removal activities could also result in area closures, for safety reasons, until the debris was removed. During this time, vegetation not impacted directly yet associated with traditional gathering would be unavailable for such uses. Debris removal would have local, short- term, negligible to minor, adverse effects to traditional plant gathering activities.

Although the channel and riverbanks of the South Fork Merced River would stabilize and natural recolonization would occur over time, this effect would possibly require 10 or more years. In the interim, erosion and erosion- related effects (e.g., bank instability and undermining streamside vegetation) would continue. These effects would have a local, long- term, negligible, adverse impact on vegetation. Overall, Alternative 1 would result in a local, negligible, adverse impact to traditional plant gathering activities in the immediate vicinity of the South Fork Bridge. The extent and quantity of plant species available to be gathered within the South Fork Merced River corridor below Wawona would be unaffected.

Summary of Alternative 1 Impacts

Alternative 1 would result in local, short- and long- term, negligible to minor, adverse impacts to ethnographic resources, i.e., plant species gathered by American Indian people in the immediate vicinity of the South Fork Bridge.

Cumulative Impacts

Cumulative effects to ethnographic resources are based on analysis of past, present, and reasonably foreseeable future actions in the Wawona area that relate to potential effects of this alternative. Ethnographic resources and their traditional cultural associations have been lost or damaged in the Wawona area through past development, visitor use, natural events, and widespread disruption of cultural traditions. However, Yosemite National Park retains many sites and resources of significance to local and culturally associated American Indians.

In general, past effects to the ethnographic resources within the South Fork Merced River are the result of thousands of years of human occupation and development. Development of facilities within the area may have disturbed or destroyed ethnographic resources, particularly prior to the advent of cultural resource laws and regulations enacted as early as the 1960s. Actions undertaken

may, therefore, have had a long- term, moderate, adverse, cumulative effect on ethnographic resources.

Reasonably foreseeable future actions in the region that may have an adverse cumulative effect on ethnographic resources include development- related projects, such as implementation of the employee housing at Wawona proposed in the *Yosemite Valley Plan*, expansion of the Wawona Campground, and the land exchange and subsequent relocation of facilities at the Seventh Day Adventist camp. Traditional gathering areas would be disturbed and modern development would be expanded at historic village areas. Implementation of this proposal of the *Yosemite Valley Plan* could have a local, long- term, adverse effects on ethnographic resources. The Merced River Plan provides a framework for decision making on future management actions within the South Fork Merced River corridor. The Merced River Plan designates ethnographic resources as an Outstandingly Remarkable Value for this reach of the river. Therefore, while there may be localized disturbances to ethnographic resources, the Outstandingly Remarkable Value must be protected and enhanced. The cumulative projects within and in the vicinity of South Fork Bridge, when considered with Alternative 1, would result in local, long- term, negligible, beneficial impacts on ethnographic resources due to protection and enhancement in accordance with the Outstandingly Remarkable Value designation.

Conclusions

Alternative 1 would result in local, short- and long- term, negligible, adverse impacts to traditionally gathered plant species in the immediate vicinity of the South Fork Bridge. Cumulative actions would have a local, long- term, negligible, beneficial effect on these resources within the South Fork Merced River corridor due to vegetation resource protection and management. Cumulative impacts have had a local, long- term, moderate, adverse, cumulative effect on traditionally gathered plant resources within the South Fork Merced River corridor due to historic development. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net long- term, minor, adverse effect on traditionally gathered plant distribution patterns in the vicinity of South Fork Bridge.

In general, there would be no change in the treatment and management of ethnographic resources as a result of Alternative 1. Any site- specific planning and compliance actions would be accomplished in accordance with stipulations in the 1999 Programmatic Agreement, and the park would continue to consult with culturally associated American Indian tribes under this agreement and the cooperative agreement for traditional uses. The cumulative projects in the Wawona area, in addition to Alternative 1, could result in a local, long- term, minor, adverse impact on ethnographic resources.

Impairment

The No Action Alternative would result in a local, short- and long- term, negligible, adverse impact to traditionally gathered plant species in the immediate vicinity of the South Fork Bridge. The effect of this alternative on vegetation resources would be localized and would not be considered severe. In addition, Alternative 1 would not change the treatment and management of ethnographic resources. The extent and quality of vegetation throughout the remainder of the South Fork Merced River corridor would remain unaffected. Therefore, Alternative 1 would not impair park resources or values.

Cultural Landscape Resources, Including Historic Sites and Structures

Analysis

Under Alternative 1, all cultural landscape resources, historic sites, and structures would continue to be managed as they are currently. The South Fork Bridge is not a contributing element due to changes made to the bridge that compromised its architectural integrity. The project poses no adverse impact to significant historic resources, such as designed landscapes and developed areas, historic buildings, and circulation systems (trails, roads, and bridges), throughout the remainder of the Wawona area.

Summary of Alternative 1 Impacts

There would be no change in the treatment and management of cultural landscape resources as a result of Alternative 1.

Cumulative Impacts

Cumulative impacts to resources located within a cultural landscape are based on analysis of past, present, and reasonably foreseeable future actions in Wawona in combination with potential effects of Alternative 1. Documentation from the Yosemite Valley area notes the disappearance of cultural landscape features that are reminders of the area's ranching, grazing, lumbering, and mining history, as well as early tourism. The South Fork Bridge is a definitive remnant of early transportation and tourism for the Wawona area.

Reasonably foreseeable future actions in the region that may have an adverse cumulative effect on cultural landscape resources include development- related projects, such as implementation of removal and construction activities such as Wawona employee housing and campground improvements associated with the *Yosemite Valley Plan*.

One of the above- mentioned projects would affect the qualities of the cultural landscape in the core Wawona area. As a result, Alternative 1 and the cumulative projects in the Wawona area would result in no change to cultural landscape resources.

Section 106 Summary. Alternative 1 does not propose a federal undertaking as described in 36 CFR 800.16(y). Therefore, there is no potential to cause effects on National Register of Historic Places- eligible cultural landscape resources.

Conclusions

There would be no change in the treatment and management of cultural landscape resources as a result of Alternative 1. Alternative 1 and the cumulative projects in the Wawona area would result in no change to the treatment and management of cultural landscape resources.

Impairment

Although cultural landscape resources along the South Fork Merced River are key to the cultural integrity of the Wawona area, this alternative would not change the treatment and management of cultural landscape resources. Cultural landscape resources throughout the remainder of the Wawona area would be unaffected. Therefore, Alternative 1 would not impair park resources or values.

Social Resources

Socioeconomics

Analysis

The South Fork Bridge would gradually deteriorate over the ensuing 10- year period, but would have a negligible adverse effect on socioeconomics until collapse occurred. Should deterioration become a concern in the short term, transfer of utility lines would be required, potentially providing some local income. A contractor would be needed to conduct bridge debris removal activities in response to an uncontrolled collapse of the South Fork Bridge. Local and regional, short- term, negligible, beneficial impacts to socioeconomics would occur for Wawona and/or Mariposa County, as a result of construction workers spending money on food, lodging, and other services, and by an influx of revenue to the construction/excavation operation selected to perform the clean- up work, as well as to the disposal/recycling facility used.

Summary of Alternative 1 Impacts

Local and regional, short- term, negligible, beneficial impacts to the socioeconomics of Wawona and/or Mariposa County are anticipated from construction workers spending money on food, lodging, gasoline, and other services, and by an influx of revenue to the construction/excavation operation selected to perform the clean- up work, as well as to the disposal/recycling facility used.

Cumulative Impacts

Cumulative effects to socioeconomics are based on analysis of past, present, and reasonably foreseeable future actions in Yosemite National Park, including the South Fork Merced River corridor and Yosemite Valley, with potential effects of this alternative. The general increase in visitation to Yosemite National Park, as well as management plans and projects involving the South Fork Merced River corridor and Yosemite Valley, could cumulatively affect socioeconomics.

As visitation continues to increase at Yosemite National Park, visitor spending would also increase at the concessions and privately owned operations in Wawona and in the park. This would have a local and regional, long- term, minor, beneficial effect on socioeconomics. Plans such as the Merced River Plan and *South Fork and Merced Wild and Scenic River Implementation Plan* generally seek to enhance the socioeconomic environment of the Merced and South Fork Merced River communities, including Wawona, in a manner consistent with Outstandingly Remarkable Values of the Wild and Scenic River. Coupled with the *Mariposa County General Plan*, these planning efforts are anticipated to have long- term, local and regional, negligible to minor, beneficial effects on the socioeconomic environment of Wawona and Mariposa County.

Construction activities associated with the South Entrance/Mariposa Grove Site Planning, employee housing at Wawona, and the Wawona Campground improvement projects would have local and regional, short- term, minor, beneficial effects on socioeconomics. These impacts would result from construction workers spending money on food, lodging, gasoline, and other services, as well as from an influx of revenue to construction contractors, material (e.g., concrete, steel) suppliers, and disposal/recycling facilities selected for use. These planning efforts and construction projects are anticipated to have a local and regional, short- and long- term, negligible to minor, net beneficial, cumulative effect on socioeconomics.

Conclusions

Local and regional, short- term, negligible, beneficial impacts to the socioeconomics of Wawona and/or Mariposa County are anticipated from construction workers spending money on food, lodging, gasoline, and other services, and by an influx of revenue to the construction/excavation operation selected to perform the clean- up work, as well as to the disposal/recycling facility used.

Local and regional, short- and long- term, negligible to minor, beneficial cumulative effects to socioeconomics would be anticipated from local and regional planning efforts, as well as the identified construction projects near the South Fork Bridge.

Impairment

The No Action Alternative would result in a negligible adverse effect on socioeconomics in the Wawona area. Socioeconomic impacts would not be considered severe and would not impair park resources or values.

Transportation

Analysis

Yosemite National Park currently experiences traffic delays and transportation issues on peak visitor days, particularly in Yosemite Valley. Gradual deterioration of the South Fork Bridge over the short term would have negligible adverse effects on transportation. Eventual, uncontrolled collapse of the South Fork Bridge under Alternative 1 would have local, short- term, negligible to minor, adverse impacts on transportation and traffic circulation within the park. Given that the temporary Bailey bridge is in place to divert traffic from the closed bridge, a collapse of the South Fork Bridge would not preclude visitors, park employees, or concessioners from using Wawona Road. However, bridge debris removal activities could cause traffic delays, anticipated to be 30 minutes or less, from trucks or other equipment using Wawona Road, or if the placement of removal equipment in the road is necessary. This would add a small amount to the minor to moderate congestion experienced on the busiest summer days.

Transit and tour bus services to the park from Fresno, through Wawona, as well as park tours from Yosemite Valley to Wawona and the Mariposa Grove of Giant Sequoias, could also be affected by traffic delays associated with bridge debris removal. These would be localized, short-term, negligible, adverse impacts, as VIA Adventures provides only one trip from Fresno per day, and the bus tour from Yosemite Valley to Wawona operates only during the summer.

The unpaved parking area in the southwest quadrant of the project site, which serves as overflow parking for the paved shuttle bus parking area, could be used for equipment staging in the event bridge debris removal is required. Closure of this parking lot to privately owned vehicles would have local, short- term, minor, adverse impacts on the availability of parking near the South Fork Bridge.

Summary of Alternative 1 Impacts

Eventual, uncontrolled collapse of the South Fork Bridge would be anticipated to result in local, short- term, negligible to minor, adverse impacts on transportation and traffic near the South Fork Bridge, including transit and tour bus operations. Should the unpaved overflow parking area

be required for equipment staging in response to bridge debris removal, closure of this lot for privately owned vehicles would have a local, short- term, minor, adverse impact on parking availability.

Cumulative Impacts

Cumulative effects to transportation are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor and Yosemite Valley with potential effects of this alternative.

Reasonably foreseeable construction activities that could further impact the transportation, traffic, and parking situation in the vicinity of the South Fork Bridge include the South Entrance/Mariposa Grove Site Planning, the Wawona Campground improvement, as well as implementation of several aspects of the *Yosemite Valley Plan*, specifically the construction of employee housing at Wawona and the increased use of public transportation through YARTS. Both activities would act to potentially increase traffic during certain periods of the day, as in the case of the new employee housing at Wawona and the Wawona Campground improvement and decrease traffic as in the case of increased use of public transportation. Delays related to equipment use or road closure for debris removal would have local, short- term (for the duration of the project), minor to moderate, adverse impacts on transportation.

However, projects implemented under the *Yosemite Valley Plan* could have a net beneficial effect on transportation, improving the attractiveness of alternative modes of transportation, and thereby reducing private automobile trips throughout the park. One general goal of the plan is to relieve congestion and to provide for alternative means of transportation, having a long- term, beneficial effect on transportation, traffic congestion, and parking availability. To the extent that transportation- related projects would replace automobile trips with bus trips, the anticipated beneficial effect would depend on ridership levels (and the corresponding number of automobile trips that would be avoided) and the technology selected for the buses.

The *Yosemite Valley Plan* has identified management actions to reduce the number of passenger vehicles within the park. The major actions identified include off- park parking areas, an expanded shuttle service, two- way traffic on currently one- way roads, road closures, and a 50% reduction of daily vehicle trips into the east valley. Locally, the closure of roads in the east valley may increase private vehicle traffic in the project area. The overall cumulative effect of these management actions, when employed, would result in regional, short- and long- term, minor to moderate, beneficial effects on transportation by reducing traffic congestion.

The gradual increase in annual visitation to the park would likely offset the beneficial effects of cumulative actions that would tend to reduce vehicle trips and their associated transportation issues. Alternative 1 would, therefore, contribute to the local, short- term, minor to moderate, adverse, cumulative effect on the transportation, traffic, and parking situation near the South Fork Bridge.

Conclusions

Deterioration of the South Fork Bridge over a 10- year period would have a negligible, adverse effect on transportation. Eventual, uncontrolled collapse of the South Fork Bridge would be anticipated to result in local, short- term, negligible to minor, adverse impacts on transportation and traffic near the bridge site, including transit and tour bus operations. Should the unpaved overflow parking area be required for equipment staging in response to bridge debris removal, closure of this lot to privately owned vehicles would have a local, short- term, minor, adverse impact on parking availability.

The gradual increase in annual visitation to the park would likely offset the beneficial effects of cumulative actions that would tend to reduce vehicle trips and their associated transportation issues. Alternative 1 would, therefore, contribute to the local, short- term, minor to moderate, cumulative, adverse effect on the transportation, traffic, and parking situation near the South Fork Bridge. Long- term, cumulative effects may be minor to moderate and could be beneficial or adverse depending on the extent to which public transportation eases traffic congestion or closures in the east valley encourage more private vehicles in this area.

Impairment

The No Action Alternative would result in a local, short- to long- term, minor to moderate, adverse impact from congested roads and lack of parking spaces. When placed in context with traffic congestion within the park on peak visitor days, transportation could impair park resources and values by negatively impacting visitor experiences and reducing the effectiveness of park operations.

Visitor Experience

Consistency with Visitor Experience and Resource Protection Provisions

This alternative does not include any actions that would be inconsistent with the interim VERP framework.

Recreation

Analysis

The South Fork Bridge would gradually deteriorate over the ensuing 10- year period and would be used by residents and tourists to occasionally provide a river crossing. However, further bridge deterioration would have a negligible, adverse effect on the visitor experience until it partially or fully collapsed. Under Alternative 1, eventual, uncontrolled bridge collapse would not preclude visitors from traveling from Yosemite Valley to Wawona, or from Wawona toward Yosemite Valley, given the availability and functionality of the temporary Bailey bridge. However, as discussed previously, visitors could be delayed in their travels due to bridge debris removal activities. In addition, failure of the bridge under Alternative 1would affect river- dependent, active recreational uses, including swimming, wading, and fishing, that occur both in the immediate vicinity of the South Fork Bridge and downstream from the bridge. Depending on the manner in which the bridge failed, people recreating in the river (e.g., rafting or fishing in the river channel) could be exposed without warning to falling and/or tumbling bridge debris, potentially resulting in serious injuries or fatalities. The potential for injuries and/or fatalities in the event of a catastrophic bridge failure would have a short- term, local, moderate to major, adverse impact on these recreational visitor experiences.

Debris deposited in the river channel, increased sedimentation, and the release of raw sewage following failure of the bridge would temporarily degrade water quality and alter water flows, adversely affecting river conditions that currently support active recreational pursuits (e.g., swimming, and fishing) in the vicinity of the South Fork Bridge. The effects of bridge failure on water quality and flows would result in a local, short- term, moderate, adverse impact to active recreational activities in the immediate project vicinity, as well as downstream.

Summary of Alternative 1 Impacts

The potential for injuries and/or fatalities in the event of a catastrophic bridge failure would have a short- term, local, moderate to major, adverse impact on recreational visitor experiences. The effects of bridge failure on water quality and flows due to accumulations of debris and release of untreated sewage would result in a short- term, local, moderate, adverse impact to active recreational activities (e.g., swimming and fishing) in the immediate project vicinity, as well as downstream. The visually intrusive effects of the riverbank damage, vegetation loss, and the presence of debris (or construction equipment needed to remove the debris) would result in a short- term, local, minor, adverse impact on passive recreational activities such as sightseeing and photography. Temporary obstruction and/or closure of existing trails, as well as associated delays during clean- up operations after the bridge failed, would result in a short- term, local, minor, adverse effect on pedestrian, livestock, or winter use in the vicinity of the South Fork Bridge. Over the long term, no impacts on recreational resources would be anticipated.

Cumulative Impacts

Cumulative effects to recreation are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor with potential effects of this alternative.

As discussed in the Merced River Plan, zoning prescriptions for the Wawona area would allow as many recreational opportunities as exist now, but would alter some uses. The concession- run stable in Wawona is currently inconsistent with management zoning prescriptions of the Merced River Plan. The stable could, however, be relocated outside of the management zone. Therefore, this would be considered a short- term, local, negligible, adverse impact. However, beneficial effects are anticipated for recreation- related Outstandingly Remarkable Values within Wawona, including opportunities to experience a spectrum of river- related recreational activities, from nature study and photography to hiking. These long- term, local and regional, minor to moderate, beneficial effects would result from the protection of recreational opportunities while precluding new development that could degrade this range or availability of opportunities on a segment-wide basis.

Other cumulative beneficial effects are expected from the *South Fork and Merced Wild and Scenic River Implementation Plan*. This plan endeavors to limit or end consumptive uses such as grazing within the river corridor and calls for the formalization of camping as well as launch facilities for non- motorized watercraft. Implementation of these actions would have a long- term, local and regional, minor to moderate, beneficial effect by eliminating impacts where feasible (grazing is not currently allowed in the river corridor), concentrating impacts in areas able to withstand visitor use, and providing facilities (e.g., restrooms) to mitigate adverse effects associated with visitor use. The Wawona Campground project could also have a long- term, local, minor, beneficial effect on recreational resources in the park when implemented by providing greater access to camping.

The cumulative effects of Alternative 1, when considered with these past, present, and reasonably foreseeable future actions, are expected to be local, minor, adverse impacts in the short term as a result of the eventual, uncontrolled collapse of the South Fork Bridge. However, local and regional, long- term, minor to moderate, cumulative, beneficial impacts would be anticipated as a result of planning efforts for the South Fork Merced River corridor. The local, short- term, minor to moderate, adverse impact on river- related recreational activities resulting from bridge failure would be offset by the beneficial impacts of the cumulative projects.

Conclusions

The potential for injuries and/or fatalities in the event of a catastrophic bridge failure would have a local, short- term, moderate to major, adverse impact on recreational visitor experiences. The

effects of bridge failure on water quality and flows would result in a local, short- term, moderate, adverse impact to active recreational activities (e.g., swimming and fishing) in the immediate project vicinity, as well as downstream. The visually intrusive effects of the riverbank damage, vegetation loss, and the presence of debris (or construction equipment needed to remove the debris) would result in a local, short- term, minor, adverse impact on passive recreational activities such as sightseeing and photography. Temporary obstruction and/or closure of existing trails, as well as associated delays during clean- up operations after the bridge failed, would result in a local, short- term, minor, adverse effect on pedestrian, livestock, or winter use in the vicinity of the South Fork Bridge. Over the long term, no impacts on recreational resources would be anticipated.

The cumulative effects of Alternative 1, when considered with these past, present, and reasonably foreseeable future actions, are expected to be local, minor, adverse impacts in the short term as a result of the eventual, uncontrolled collapse of the South Fork Bridge. However, long- term, minor to moderate, local and regional, cumulative, beneficial impacts would be anticipated as a result of planning efforts for the South Fork Merced River corridor.

Impairment

The No Action Alternative would result in local, short- term, minor to moderate, adverse impacts on river- related recreation activities resulting from short- term deterioration and potential bridge failure. Although the South Fork Merced River and river- related recreation are important components of providing opportunities for enjoyment of the park, the effect of this alternative on recreation would be primarily localized to the South Fork Bridge area, limited in duration, and the effect would not be considered severe. The diversity and quality of river- related recreational opportunities throughout the remainder of Yosemite National Park would remain unaffected. Therefore, Alternative 1 would not impair river- related recreational opportunities.

Scenic Resources

Analysis

Under Alternative 1, the condemned and closed South Fork Bridge would remain in its existing condition without maintenance or repair. Because it has been closed, the bridge has been restricted for vehicle use by placing unsightly white concrete barriers at both termini. The white concrete barriers would continue to intrude visually upon the scenic character of the Wawona area. In addition, the condition of the bridge would continue to deteriorate until the bridge collapsed, adding to the now- visible signs of disuse. Due to the closure of the South Fork Bridge, a temporary Bailey bridge has been placed to carry traffic on Wawona Road, the placement is approximately 50 to 100 feet upriver. The Bailey bridge represents a major visual intrusion, because it is rectangular in shape, very tall, and its bright, silver- colored, galvanized, steel latticework is out of character for this rustic site. In its current state, the South Fork Bridge piers are surrounded by deep scour holes. The concrete surfaces of the bridge rails are pitted and becoming cracked, and the wingwalls and abutments are showing some deterioration. Further bridge deterioration would have a minor adverse effect on scenic resources until collapse occurred. Under Alternative 1, it is assumed that the bridge condition and continued deterioration would result in an uncontrolled failure, possibly in stages over a period of time. Bridge debris would litter the river channel of the South Fork Merced River, diminishing the scenic quality of the river channel where it was deposited.

Bridge failure could result in large pieces of the bridge gouging into banks, scouring the river bottom, and removing riparian vegetation. Under Alternative 1, it is assumed that debris deposited in the channel by the bridge collapse would be removed by the National Park Service as soon as

feasible. However, depending on the time of year and river conditions when the bridge failure occurred, completion of cleanup could be delayed for several months. Construction and transport equipment needed to remove the concrete, steel, and rock masonry debris from the river would temporarily increase the visual intrusion resulting from bridge failure. Following debris removal, riverbank damage, including tree removal for access, would be visible for several years. The continuing deterioration of the existing bridge, deposition of debris in the river following failure of the bridge, and operation of equipment to remove and transport debris would result in a local, short- term, minor, adverse effect on scenic resources of the Wawona area.

The long- term effect of the South Fork Bridge failure under Alternative 1 would be to remove a structure that, in its present condition, is a source of visual intrusion upon the scenic character of the Wawona area. As noted, the ongoing deterioration of the bridge piers, abutments, and façade are visible and detract from views of the natural landscape in which the bridge is an element. To exacerbate this situation is the presence of the visually intrusive temporary Bailey bridge, currently in place to carry Wawona Road traffic. Failure of the existing bridge would result in a local, long- term, minor, beneficial effect on scenic resources at Wawona.

Summary of Alternative 1 Impacts

The No Action Alternative would result in a local, short- term, minor, adverse impact to scenic resources in the vicinity of the South Fork Bridge, due to the visual intrusion effects of the bridge debris that would litter the South Fork Merced River following collapse; of the equipment present to remove debris; and of any damage to riverbanks and riparian vegetation. Prior to collapse of the bridge, the existing concrete barriers and deteriorating appearance of the bridge would continue to intrude upon the scenic character of Wawona. The ultimate removal of the South Fork Bridge under Alternative 1 due to failure would result in a local, long- term, minor, beneficial impact to scenic resources at Wawona.

Cumulative Impacts

Cumulative impacts to scenic resources are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor, in combination with potential effects of this alternative.

Scenic resources have been affected by numerous past actions since the park was designated. Alteration of park resources by Euro- American settlers to the area is evident at Wawona. Early settlers to the area farmed, ranched, logged, and constructed lodging and outbuildings. Water was diverted for farming and to dewater areas for development. Larger developments in the area include Wawona, the Wawona Hotel, Wawona Golf Course, Wawona Store, and the Pioneer Yosemite History Center.

Reasonably foreseeable future actions within the South Fork Merced River corridor are considered to have an overall beneficial effect on scenic resources. For example, the Merced River Plan protects river- related natural resources through the application of management elements, including the River Protection Overlay, management zoning, protection and enhancement of Outstandingly Remarkable Values, and implementation of a VERP framework. Obtaining land currently being used as the Seventh Day Adventist Camp near Wawona in exchange for land adjacent to the camp, but removed from the National Park Service Wilderness Boundary, along with redesign and construction of the existing and new campground facilities, would further provide for scenic resource preservation, protection, and management activities in the South Fork Merced River drainage in the project vicinity. Construction of employee housing and the South Entrance/Mariposa Grove planning projects would be completed with protection of scenic resources as a project goal. These construction projects would have local, short- term, minor, adverse impacts on scenic resources.

The cumulative activities within and in the vicinity of the South Fork Merced River corridor would result in a local, long- term, negligible to minor, beneficial, cumulative impact on scenic resources because of resource protection and management goals. Alternative 1 and the cumulative projects within and in the South Fork Merced River corridor would result in a local, long- term, negligible to minor, beneficial impact on scenic resources of the Wawona area.

Conclusions

The No Action Alternative would result in a local, short- term, minor, adverse impact to scenic resources in the vicinity of the South Fork Bridge due to the visual intrusion effects of the bridge debris that would litter the riverbed and possible damage to riverbanks and riparian vegetation following bridge collapse. Prior to bridge collapse, the white concrete barriers, deteriorating condition of the bridge, and the temporary Bailey bridge would continue to intrude upon the scenic character of the Wawona area resulting in a short- term, minor, adverse impact to scenic resources.

Cumulative actions would have a local, long- term, negligible to minor, beneficial cumulative effect on scenic resources within the South Fork Merced River corridor due to resource protection and management. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 1, would have a net local, long- term, negligible to minor, beneficial effect on scenic views. These beneficial effects on scenic resources would outweigh the short-term adverse effect associated with Alternative 1 and the cumulative development- related projects.

Impairment

The No Action Alternative would result in short- term adverse impacts to scenic resources within the vicinity of the South Fork Bridge. Although the South Fork Merced River is central to the scenery near Wawona, the short- term, adverse effect of this alternative on scenic resources would be primarily localized, temporary in duration, and would not be considered severe. Therefore, Alternative 1 would not impair scenic resources.

Park Operations and Facilities

Analysis

Under Alternative 1, the South Fork Bridge would remain in place without maintenance or repair. Although the bridge is blocked by concrete barriers, limited use of the bridge by visitors, hikers, and local residents walking across the structure to avoid the very narrow temporary bridge, does occur. For safety purposes, park operations staff is required to discourage such encroachments and prevent public access to the extent feasible. Over the long term, the bridge would continue to deteriorate and eventually fail, likely during high- flow conditions. Further bridge deterioration would have a minor effect to park operations and would require minor maintenance activities until the bridge collapsed. The collapsed bridge could block the flow of the river, which would be forced to flow around the bridge, causing substantial erosion on both banks of the river, as well as other adverse impacts. Park operations staff would be required to remove the bridge debris as soon as feasible under emergency conditions, and repair facilities that may be damaged (e.g., parking areas, etc.) around the bridge site.

Bridge collapse could result in a short- term (immediate) and dramatic increase in demand for the full range of park operations and emergency response staff to remove bridge debris and repair

damaged facilities around the bridge site. This could have a local, short- term, moderate to major, adverse impact on park operations.

The South Fork Bridge supports utility line conduits for water, sewage, electricity, and communications functions. Should an uncontrolled collapse of the South Fork Bridge occur, the lines would likely sever, and the following functions would be interrupted: (1) delivery of tertiary-treated gray water from the water treatment plant to the pump station for the Wawona Golf Course; (2) delivery of sewage from the Wawona Hotel and other operations to the wastewater treatment plant; (3) delivery of telephone and internet access to the Wawona Hotel; and (4) delivery of electricity to the pump station. However, these utility lines could be restored relatively quickly, given the availability of the temporary Bailey bridge for supporting the conduits. Therefore, local, short- term, moderate to major, adverse impacts to park operations and facilities would be anticipated.

Summary of Alternative 1 Impacts

Further bridge deterioration would have a minor, adverse effect on park operations and facilities, requiring periodic maintenance activities, mostly on utility lines, until bridge collapse occurred. Local, short- term, moderate to major, adverse impacts to park operations and facilities would result from the immediate and dramatic increase in demand for park operations and emergency response staff should the South Fork Bridge collapse. Local, short- term, moderate to major, adverse impacts to park operations and facilities would also be anticipated in the event of an uncontrolled collapse of the South Fork Bridge. This would result from the temporary disruption of utility lines carrying water, sewage, electricity, and communications functions.

Cumulative Impacts

Cumulative effects to park operations and facilities are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor and Yosemite Valley with potential effects of this alternative. The extent to which past, present, or reasonably foreseeable future projects could have a cumulative effect, when combined with this alternative is determined largely by whether such projects would affect park facilities or the demand for park operation services.

The *Merced Wild and Scenic River Comprehensive Management Plan* and the *Yosemite Valley Plan* seek to improve park operations and resources protection in the Merced and South Fork Merced Wild and Scenic River corridors. However, implementation of the plans would substantially increase demand on park operations and facilities in the short- term, during planning, repair, rehabilitation, construction, demolition, development of the VERP framework, and replacement of facilities. Implementation of these plans is expected to have local, short- term, moderate to major, adverse impacts on park operation services and facilities. In the long term, improvement to park facilities and operations is expected to result in a moderate beneficial impact, however, ever increasing visitor use and aging of these facilities will eventually negate the beneficial impacts.

Although project oversight and emergencies associated with the construction projects identified in Appendix D could require a full range of park operations and emergency response personnel, these projects would seek to improve park facilities. The projects, coupled with several others that would upgrade campgrounds and other facilities, would have a short- and long- term, minor, local, beneficial impact on park facilities. The upgrades would also seek to eliminate maintenance work associated with the deteriorating or failing facilities, resulting in a local, short- and long-term, minor, beneficial effect on park operations.

Overall, the past, present, and reasonably foreseeable future actions would have local, minor to moderate, adverse cumulative impacts, when considered with Alternative 1, because of the increased demand on park operations, services, and facilities in the short- and long- term.

Conclusions

Short- term, local, moderate to major, adverse impacts to park operations and facilities would result from the immediate and dramatic increase in demand for park operations and emergency response staff should the South Fork Bridge collapse. Short- term, local, moderate to major impacts to park operations and facilities would also be anticipated in the event of an uncontrolled collapse of the South Fork Bridge. This would result from the temporary disruption of utility lines carrying water, sewage, electricity, and communications functions.

Overall, the past, present, and reasonably foreseeable future actions would result in local, short- and long- term, minor to moderate, adverse, cumulative impacts, when considered with Alternative 1, because of the increased demand on park operations, services, and facilities. In the long term, improvement to park facilities is expected to result in a moderate beneficial impact; however, over time these benefits will be negated through increased visitor use and aging.

Impairment

Impairment of the South Fork Merced River is not addressed under park operations and facilities because this resource topic is peripheral to the protection of the river for future generations.

Alternative 2: Preferred Alternative

Alternative 2, the Replace South Fork Bridge alternative, would remove the condemned and closed 134- foot- long, three- span (with two piers in the riverbed), South Fork Bridge and replace it with a 150- foot- long, single- span bridge (no piers in the riverbed) on the same location and alignment. The new bridge would be 42- feet wide to accommodate wider travel lanes, shoulders, and a 5- foot- wide sidewalk. Alternative 2 would require transferring the utility lines (e.g., reclaimed water, sewage, high voltage electrical, and telecommunications) to the temporary Bailey bridge, removing the existing South Fork Bridge, constructing the new bridge and reattaching the utility lines, removing the temporary bridge and access road, and restoring disturbed areas of the site.

Alternative 2 would be enacted by removing the existing bridge in liftable segments during the low- flow portion of the year (September – December 2003). A temporary containment system would be installed to prevent small debris from demolition and cement slurry produced by concrete saws from entering the South Fork Merced River. However, not all demolition debris would be prevented from falling into the river, and masonry debris greater than 2- inches in diameter and metal debris of any size would be removed from the riverbed. A temporary structural support system consisting of scaffolding, jacks, or mechanical lifts, may be installed, if necessary, to prevent collapse of the bridge structure during demolition, as a construction platform for the new bridge, and as an anchor for the containment system.

During demolition and construction, traffic will flow relatively unimpeded and continue to use the temporary Bailey bridge that was constructed and placed in service in 1998. Following construction of the new bridge, the temporary Bailey bridge will be removed. All materials used for building the new bridge, demolition materials, and the dismantled temporary bridge would be stored at the Wawona District Materials Storage Area, near the South Fork Bridge site.

Natural Resources

Geology, Geologic Hazards, and Soils

Analysis

Bridge removal and replacement would have short- term, adverse, demolition and construction-related effects on soils (e.g., excavation, compaction). However, demolition and construction of the bridge would occur in a controlled manner (e.g., working within a delineated area and applying Best Management Practices such as providing erosion and sediment control measures). Alternative 2 would avoid the more extensive adverse effects of bank erosion and bank trampling due to bridge debris retrieval activities described under Alternative 1. Removing instream structures would minimize constriction of river flow, reducing the amount of water forced under the bridge and its velocity as it passes near and under the bridge opening. This would reduce bank erosion and impacts to soils when compared to Alternative 1. As a result, Alternative 2 would have a local, short- and long- term, negligible to minor, beneficial effect on soil resources. In addition, site restoration and stabilization would repair eroded areas and increase the protection of riverbanks, adjacent trails, and Wawona Road, resulting in a local, long- term, minor, beneficial impact on soils. Streambank erosion following bridge construction would result in local, short- and long- term, adverse effects to soils, which will be mitigated somewhat by construction Best Management Practices, site maintenance following construction, and revegetation. Alternative 2 would result in the construction of a new bridge designed in accordance with seismic (engineering) requirements; therefore, compared to Alternative 1, Alternative 2 would have a local, long- term, minor, beneficial impact regarding geologic hazards.

Summary of Alternative 2 Impacts.

Because Alternative 2 would avoid the more extensive adverse effects of bank destabilization, erosion, and soil compaction and loss due to uncontrolled bridge collapse and debris retrieval activities described under Alternative 1, Alternative 2 would have a local, short- and long- term, negligible, beneficial effect on soil resources. Alternative 2 would also result in local, long- term, minor, beneficial impact with respect to geologic hazards, because the bridge designed under Alternative 2 would be constructed to updated seismic engineering design standards. Site restoration and stabilization would repair eroded areas and increase the protection of riverbanks, adjacent trails, and Wawona Road, resulting in a local, long- term, minor, beneficial impact on soils.

Cumulative Impacts

The cumulative impact analysis for geology in Alternative 2 is the same as described under the No Action Alternative. Please see discussion of cumulative impacts under Alternative 1.

Past, present, and reasonably foreseeable future actions include the proposed expansion of the Wawona Campground and the land exchange to acquire portions of the Seventh Day Adventist Camp in Wawona adjacent to the National Park Service Wilderness. The campground expansion would affect soil resources northwest of the South Fork Bridge while the land exchange could result in protection of soil resources adjacent to wilderness areas. Alternative 2 and the cumulative projects would result in a local, long- term, minor, beneficial impact to soil resources and geologic hazards as Alternative 2 would incorporate updated seismic engineering design standards and avoid the more extensive adverse effects of soil erosion and bank destabilization

compared to Alternative 1. Soil erosion associated with the existing bridge results from deflection of flows off piers and encroaching abutments. The proposed structure would eliminate the effect of piers, reduce the impacts to soils caused by the abutments, and would have less effect because of wider abutment placement following construction. However, the presence of the abutments would continue to cause some associated soil erosion, resulting in a local, short- and long- term, minor, beneficial effect to soil erosion when compared with Alternative 1.

Conclusions

Alternative 2 would avoid the more extensive adverse effects of erosion and bank destabilization due to uncontrolled bridge collapse and debris retrieval activities described under Alternative 1; therefore, Alternative 2 would have a local, short- and long- term, negligible, beneficial effect on soil resources. Alternative 2 would result in the construction of a bridge designed to updated seismic engineering standards and would have a local, long- term, minor, beneficial impact compared to Alternative 1. Site restoration and stabilization would repair eroded areas and increase the protection of riverbanks, adjacent trails, and Wawona Road, resulting in a local, long- term, minor, beneficial impact on soils.

Alternative 2 and the cumulative projects would result in a local, long- term, minor, beneficial impact to soil resources. Alternative 2 would avoid the more extensive adverse effects of bank erosion compared to Alternative 1.

Impairment

Alternative 2 would result in beneficial effects on soil resources. Therefore, the effect of Alternative 2 would not impair geologic or soil resources.

Hydrology, Floodplains, and Water Quality

Under Alternative 2, the South Fork Bridge would not adversely influence river flow dynamics and hydrologic processes or present a potential flood hazard because the bridge would be removed, thus reducing the constriction on the natural flow of the river. Entire removal of the bridge piers would remove a flow restriction and return flows to more natural conditions.

Removal and replacement of the South Fork Bridge would help restore near active flood regime and hydrologic processes. The reconstruction of the South Fork Bridge would minimize constriction of river flow and improve the local, natural hydrologic regime. Alternative 2, when compared to the further bridge deterioration over the next 10 years described under Alternative 1, would result in local, long- term, minor, beneficial impacts on hydrologic processes that influence river morphology. Alternative 2 would have a local, long- term, minor, beneficial impact on the hydrologic processes that influence river morphology compared to Alternative 1, due to the avoidance of bank erosion and localized flooding associated with catastrophic bridge collapse.

Demolition and construction of the South Fork Bridge under Alternative 2 would cause minor amounts of sediment to be released into the river. The sediment would originate from the finer-grained material behind and beneath the existing and proposed abutments. As the abutments are reconstructed, these materials could be dislodged and released into the river. However, the amount of sediment released is expected to be minor and would not cause excessive turbidity downstream. Measures to control sediment sources using the proposed containment system (e.g., a tarp, net, or cage suspended beneath the bridge) would serve to capture the majority of sediment released during demolition and construction. Sediment sources include concrete dust generated during bridge cutting, concrete slurry during construction, friable concrete dislodged while the concrete sections are removed, soil used for abutment backfill, and steel fragments.

Sediment loads would increase temporarily should a structural support system be constructed to brace the bridge during demolition operations. If utilized, the system necessary to support the bridge and prevent uncontrolled collapse would need to be securely anchored to buttress the bridge and tolerate its weight upon collapse. Such a support system would require a substantial foundation, possibly consisting of vertical supports, mechanical lifts, and temporary foundation blocks. Construction and placement of a structure capable of supporting the weight of the bridge could disturb a considerable amount of the streambed and cause higher than normal turbidity. Constructing the support system with wheeled or tracked equipment in the river would place additional sediment in suspension. Temporary ramps built to place equipment in the river could also dislodge sediment from the riverbed and banks. However, the sediment dislodged during demolition and construction of the structural support system would only temporarily impact water quality within a localized area and the sediment would settle out downstream, particularly considering that demolition and construction are proposed to take place during periods of low flow. The sediment dislodged by construction associated with Alternative 2 is anticipated to be less than would occur under the No Action Alternative because demolition and reconstruction would occur in a controlled manner (e.g., within a delineated work area, during low flow conditions, with the application of Best Management Practices). Alternative 2 would avoid the more pronounced sedimentation effects described under Alternative 1. Therefore, Alternative 2 would have a local, short- term, negligible, beneficial effect on water quality compared to Alternative 1.

Water quality could be compromised if petroleum compounds were discharged from heavy equipment. The proposed Best Management Practices implemented under this alternative would ensure that petroleum releases from heavy equipment are minimized within the work area. Although there are potential sources of pollutants (e.g., sediment, petroleum products) associated with the removal and replacement of this bridge, its replacement would eliminate a long- term source of pollutants, including sediment from continued scouring and undermining of the bridge abutments and piers, as well as concrete and steel from long- term degradation of the bridge (or sudden collapse). As a result, Alternative 2 would have a local, short- term, negligible, beneficial effect on water quality compared to Alternative 1.

Summary of Alternative 2 Impacts

Under Alternative 2, the gradual deterioration of the South Fork Bridge described under Alternative 1, would not occur, resulting in local, long- term, minor, beneficial impacts to hydrologic processes. Alternative 2 would have local, short- and long- term, negligible to minor, beneficial impacts on hydrologic processes and water quality due to the avoidance of most bank erosion and localized flooding associated with catastrophic bridge collapse, reduced sedimentation, and controlled removal of the bridge compared to Alternative 1.

Cumulative Impacts

The cumulative impacts analysis for Alternative 2 is the same as described under Alternative 1. The beneficial and adverse cumulative effects would result in an overall local, long- term, minor, beneficial impact to hydrologic processes and water quality. The past, present, and reasonably foreseeable future actions considered cumulatively with Alternative 2, would have a local, long- term, minor, beneficial impact on hydrologic processes. The beneficial impacts associated with Alternative 2 would nominally contribute to overall beneficial cumulative impacts on hydrologic processes and water quality.

Conclusions

Alternative 2 would have local, short- and long- term, minor to moderate, beneficial impacts on hydrologic processes and water quality. Reconstruction of the South Fork Bridge would minimize constriction of river flow and improve the local natural hydrologic regine. In addition, the reconstruction would avoid bank erosion and localized flooding associated with catastrophic bridge collapse, reduce sedimentation, and provide for controlled removal of the bridge when compared to Alternative 1.

The past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor, considered cumulatively with Alternative 2, could have a local, long- term, minor, beneficial impact on hydrologic processes. The beneficial impacts associated with Alternative 2 would nominally contribute to overall beneficial cumulative impacts on hydrologic processes and water quality.

Impairment

Alternative 2 would have local, short- and long- term, negligible to minor, beneficial impacts on hydrologic processes and water quality. Alternative 2 would not impair hydrologic resources within the South Fork Merced River corridor.

Wetlands

Analysis

The South Fork Bridge currently impacts wetland and aquatic resources because of shading, scour pool formation around the piers and downstream from piers, and by riverbank erosion. Because bridge removal and construction activities will result in the same impacts to wetland and aquatic resources, both actions are considered in this analysis. Removal/construction of the South Fork Bridge would have local, short- term, adverse, demolition/construction- related effects, including cofferdam placement, to approximately 0.27 acre of aquatic habitat (90- foot- wide work zone). Within this work zone, approximately 0.03 acre of sparse scrub- shrub emergent wetland has become established along the low- flow channel. Most of the sparse wetland habitat is located between the existing bridge and the temporary bridge, continuing upriver from the temporary bridge. Emergent wetland and aquatic habitat described in the streambed of Angel Creek, downstream from the bridge would not receive demolition/construction- related impacts. Effects to wetland and aquatic habitats would result from heavy equipment used for demolition/construction activities, causing soil disturbance and compaction, generating dust, vegetation removal, root damage to adjacent vegetation, erosion, and potential introduction and spread of non- native species. Soil disturbance would result in the addition of silt, resuspension of sediment, or the introduction of construction equipment- related pollutants (e.g., fuels, lubricants, etc.) that could degrade the quality of wetland and aquatic habitats in the immediate vicinity of the bridge. Because demolition/construction would occur in a controlled manner within a designated/delineated work area, during low flow, and with the application of mitigation measures described in Chapter II (e.g., Best Management Practices), Alternative 2 would avoid the more pronounced adverse effects of debris retrieval activities described under Alternative 1 and would reduce the potential adverse impacts to wetland and aquatic habitats to a negligible intensity. The application of mitigation measures described in Chapter II, Best Management Practices, would further reduce the potential adverse impacts to wetland and aquatic habitats. Therefore, Alternative 2 would have a local, short- term, negligible, adverse effect on the riverbed environment.

Following abutment removal and replacement, minor regrading of the bridge construction site and the temporary bridge removal site, as well as revegetation, would be used to increase bank integrity. Alternative 2 would result in the removal of approximately 0.03 acre of sparse, scrub-shrub wetland habitat (dominated by sandbar willow), but with mitigation (salvage of willow shrubs and sedge clumps for reintroduction or replacement of willows using stem cuttings) would result in no net loss of wetland functions or values. Implementation of Alternative 2 would result in a site- specific, short- term, negligible to minor, adverse effect on wetland resources; and a site-specific, long- term, negligible to minor, beneficial effect on aquatic resources and riverine areas that provide habitat for a diversity of river- related species. The extent and quality of wetland, aquatic, riparian and other riverine habitats throughout the remainder of the South Fork Merced River corridor of the river would be unaffected.

Summary of Alternative 2 Impacts

Removal of the South Fork Bridge would restore the free- flowing condition of this stretch of the South Fork Merced River and return this reach to a more natural state, thereby enhancing its biological integrity. Alternative 2 would result in a site- specific, short- term, negligible to minor, adverse impact to sparse scrub- shrub wetland habitat of the low- flow channel during South Fork Bridge removal and replacement activities. Alternative 2 would also result in a site- specific, long-term, negligible to minor, beneficial effect on aquatic resources and riverine areas that provide habitat for a diversity of river- related species. The extent and quality of wetland, aquatic, riparian and other riverine habitats throughout the remainder of the South Fork Merced River corridor would be unaffected.

Cumulative Impacts

The direct and indirect effects of this alternative to wetlands are minimal; therefore, the cumulative impact analysis for wetland resources in Alternative 2 is the same as described under the No Action Alternative. Please see discussion of cumulative impacts under Alternative 1. Cumulative actions would have a local, long- term, negligible to minor, beneficial, cumulative effect on wetlands within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net local, long- term, negligible to minor, beneficial effect on wetland patterns.

Conclusions

Alternative 2 would result in a site- specific, short- term, negligible to minor, adverse effect on wetland resources within the South Fork Merced River low- flow channel. Alternative 2 would also result in a site- specific, long- term, negligible to minor, beneficial effect on aquatic, riparian, and other riverine resources that provide habitat for a diversity of river- related species. The extent and quality of wetland, riparian, aquatic, and other riverine habitats throughout the remainder of this river reach would be unaffected. Cumulative actions would have a local, long-term, negligible to minor, beneficial effect on wetlands within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net local, long- term, negligible to minor, beneficial effect on wetland patterns.

Impairment

With the incorporation of mitigation into the design of this alternative, Alternative 2 would result in a local, long- term negligible to minor, beneficial impact to wetlands, aquatic resources, and riverine areas that provide habitat for a diversity of river- related species. Alternative 2 would not impair wetland resources or values within the South Fork Merced River corridor.

Vegetation

Analysis

Removal/construction of the South Fork Bridge would have local, short- term, adverse, demolition/construction- related effects to native and non- native vegetation communities in the immediate vicinity of the South Fork Bridge. Effects would result from heavy equipment and demolition/construction activities, including cofferdam placement, and would include soil disturbance, soil compaction, dust, vegetation removal, root damage to adjacent vegetation, erosion, and potential introduction and spread of non- native species. Approximately 0.27 acre of aquatic habitat (e.g., river cobble with some attached aquatic moss), and 0.03 acre of sparse scrub- shrub wetland (e.g., sandbar willow and sedge providing less than 15% foliar cover) vegetation would be disturbed during demolition/construction activities.

Mature trees would be retained in the riparian area, to the extent practicable. Mature white alder, incense- cedar, and ponderosa pine are present adjacent to the existing bridge and could be adversely affected or removed during demolition/construction activities, although the National Park Service would take all reasonable precautions to avoid damaging the trees and their root structure. Approximately 0.75 acre of upland habitat dominated by native and non- native herbaceous species, and the existing temporary road that was constructed across an informal parking area devoid of vegetation could also be affected by construction/demolition activities. Because construction/ demolition activities would be conducted in a controlled manner (e.g., within a delineated work area, with the application of Best Management Practices, etc.), Alternative 2 would avoid the more pronounced adverse effects of debris retrieval activities described under Alternative 1. The application of mitigation measures described in Chapter II, Best Management Practices, would further reduce the potential adverse impacts to native vegetation to a negligible to minor intensity.

Removal of the South Fork Bridge would restore the free- flowing condition of the river and return this reach to a more natural state, enhancing its biological integrity. Following demolition/ construction activities, including temporary road and bridge removal, regrading and revegetation would diversify upland vegetation (e.g., using lupine and grass seed, etc.) and would increase riverbank and riparian vegetation integrity. Implementation of Alternative 2 would result in site-specific, long- term, negligible to minor, beneficial effects on vegetation, including aquatic, wetland, riparian, and upland types, and other riverine areas that provide habitat for a diversity of river- related species. The extent and quality of vegetation, including aquatic, wetland, riparian, and upland types, and other riverine habitats throughout the remainder of the South Fork Merced River corridor would be unaffected.

Summary of Alternative 2 Impacts

Removal of the South Fork Bridge would restore the free- flowing condition of the South Fork Merced River and return this reach to a more natural state, enhancing its biological integrity. Alternative 2 would result in a site- specific, long- term, negligible to minor, beneficial effect on vegetation, including aquatic, wetland, riparian, and upland types that provide habitat for a diversity of river- related species. Approximately 0.75 acre of sparse upland vegetation that includes non- native plant species and areas that have been paved would receive impacts during demolition/construction activities, resulting in site- specific, short- term, minor to moderate, adverse impacts due to soil disturbance and compaction. However, the project site would be revegetated, resulting in site- specific, long- term, minor, beneficial impacts to the vegetation resource.

Cumulative Impacts

Because the direct and indirect effects of this alternative are minimal, the cumulative impact analysis for vegetation in Alternative 2 is the same as described under the No Action Alternative. Please see discussion of cumulative impacts under Alternative 1.

Cumulative actions would have a long- term, minor, beneficial cumulative effect on vegetation within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net long- term, minor, beneficial effect on vegetation patterns within the South Fork Merced River corridor.

Conclusions

Removal of the bridge pieces and abutments would restore the free- flowing condition of the South Fork Merced River and return this portion of the river to a more natural state, thereby enhancing its biological integrity. Alternative 2 would result in a site- specific, long- term, negligible to minor, beneficial effect on vegetation, including aquatic, wetland, riparian, and upland types that provide habitat for a diversity of river- related species. The extent and quality of vegetation, including aquatic, wetland, riparian, and upland types, and other riverine habitats throughout the remainder of the South Fork Merced River corridor would be unaffected. Cumulative actions would have a long- term, minor, beneficial effect on vegetation within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net long- term, minor, beneficial effect on vegetation patterns.

Impairment

Alternative 2, with the incorporation of mitigation into the design, would restore this portion of the river to a more natural state, thereby enhancing its biologic integrity. Implementation of Alternative 2 would result in a local, long- term, negligible to minor, beneficial effect on vegetation, including aquatic, wetland, riparian, and upland types that provide habitat for a diversity of river- related species. Alternative 2 would not impair vegetation resources or values within the South Fork Merced River corridor.

Wildlife

Analysis

Localized, short- term, minor, temporary effects on wildlife could occur during demolition/ construction of the South Fork Bridge. Effects would be related to heavy equipment use and human intrusion and could include increased dust, soil disturbance and soil compaction, vegetation removal, noise, sedimentation, elevated turbidity, and decreased oxygen levels. These actions could result in direct losses of nest sites or burrows, and reproductive habitat for aquatic organisms and indirect effects through the disturbance of nesting birds or roosting bats. Because demolition/construction would be conducted in a controlled manner (e.g., within a delineated work area, during low- flow conditions, with the application of Best Management Practices), Alternative 2 would avoid the more pronounced adverse effects of debris retrieval activities described under Alternative 1. The application of a containment system and other mitigation measures, or Best Management Practices, would further reduce the potential adverse impacts to native fish and wildlife. Removal of the bridge piers would result in some loss of habitat diversity and structure for fish and aquatic organisms, because the scour holes will be filled by river cobble, resulting in a run or riffle habitat in a free- flowing river. However, pier removal would eliminate

an obstruction to fish movement in this reach of the South Fork Merced River. Some trees and shrubs that could provide perches and nest sites would be removed to accommodate demolition/ construction activities. Minor regrading and revegetation following demolition/construction and removal of the temporary bridge would increase riverbank integrity, somewhat improving wildlife habitat and reducing the potential for long- term periodic aquatic habitat disturbances. Bat roosting habitat under the South Fork Bridge would be designed under the new bridge as a mitigation for wildlife impacts. Additional mitigation is described under the wetland and vegetation resource areas, as it relates to wildlife habitat avoidance, the minimization of impacts to wildlife habitat, and revegetation of disturbed portions of the project area. Implementation of Alternative 2 would result in a site- specific, long- term, minor, beneficial effect on wildlife and habitat for a diversity of river- related species. The extent and quality of wildlife habitats throughout the remainder of the South Fork Merced River corridor would be unaffected.

Summary of Alternative 2 Impacts

Removal of the South Fork Bridge would restore the free- flowing condition of the South Fork Merced River, returning this reach to a more natural condition and enhancing the biological integrity. Alternative 2 would result in a local, long- term, minor, beneficial effect on wildlife and habitat for a diversity of river- related species. Localized, negligible, short- term, adverse impacts are expected during bridge removal. The extent and quality of wildlife habitats throughout the remainder of the South Fork Merced River corridor would be unaffected.

Cumulative Impacts

Because the direct and indirect effects of this alternative are negligible to minor, the cumulative impact analysis for wildlife in Alternative 2 is the same as described under the No Action Alternative. Please see discussion of cumulative impacts under Alternative 1.

Cumulative actions would have a local, long- term, minor to moderate, beneficial, cumulative effect on wildlife within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net local, long- term, minor to moderate, beneficial effect on wildlife patterns in the South Fork Merced River corridor.

Conclusions

Removal of the South Fork Bridge would restore the free- flowing condition of the river and return this reach to a more natural state, thereby enhancing the biological integrity. Alternative 2 would result in a site- specific, long- term, minor, beneficial effect on wildlife and habitat for a diversity of river- related species. During bridge removal and construction, local, negligible, short- term, adverse impacts are expected to occur. The extent and quality of wildlife habitats throughout the remainder of the South Fork Merced River corridor would be unaffected. Cumulative actions would have a local, long- term, minor to moderate, beneficial, cumulative effect on wildlife within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net local, long- term, minor to moderate, beneficial effect on wildlife patterns.

Impairment

Given the incorporation of mitigation into the design of this alternative, Alternative 2 would result in local, long- term, negligible to minor, beneficial impacts to native wildlife and habitat for a diversity of river- related and adjacent upland species. Alternative 2 would not impair wildlife resources or values.

Special-Status Species

Special- status species known or likely to occur in the immediate vicinity of Wawona include the Wawona riffle beetle and nine species of bats (refer to Chapter III and Appendix C for additional information). The following subsections discuss impacts of Alternative 2 on these species and their habitat, as well as habitat considered suitable for other special- status species.

Analysis

Localized, short- term, minor effects on special- status species could occur during demolition/ construction of the South Fork Bridge. Effects would be related to heavy equipment and human intrusion and could include soil disturbance and soil compaction, increased dust, vegetation removal, noise, sedimentation, elevated turbidity, and decreased oxygen levels.

Following demolition/construction activities, including temporary road and bridge removal, regrading and revegetation would increase riverbank and riparian vegetation integrity, somewhat improving habitat for raptors, passerine birds, and the Wawona riffle beetle at this site. Implementation of Alternative 2 would result in a site- specific, long- term, negligible, beneficial effect on the extent and quality of river- related species. The extent and quality of river- related species throughout the South Fork Merced River corridor would be unaffected.

Special-Status Species of Invertebrates: Amphibians. Bridge removal would have localized, short- term, minor, adverse effects on the Wawona riffle beetle; potential habitat for the California red- legged frog, northwestern and southwestern pond turtles, and the foothills yellow- legged frog. Effects would be related to heavy equipment and human intrusion and could include vegetation removal, decreased oxygen levels, the addition of silt, resuspension of sediment, or the introduction of pollutants (i.e., fuels, lubricants). These actions could result in direct losses of individuals or habitat for these species at the project site and downstream of the bridge; however, they will occur at a time period when Wawona riffle beetles are not present. The application of mitigation measures described in Chapter II (e.g., carry out demolition/ construction activities during a low- water period, move or work in or adjacent to aquatic habitats, fueling and maintenance of vehicles and equipment outside aquatic habitat, minimize area of construction, minimize equipment operation in the river, reduce stream sediment loading, etc.) would reduce the potential adverse impacts to individuals or habitat of these special- status species to a negligible intensity.

Removal of the South Fork Bridge would restore the free- flowing condition of the South Fork Merced River and return this portion of the river to a more natural state, thereby enhancing the biological integrity of this reach for special- status invertebrates and amphibians.

Special-Status Species of Bats. Bridge removal activities would have a local, short- term, minor, adverse effect on special- status bats in the immediate vicinity of Wawona. Effects would be related to heavy equipment and human intrusion and could include disruption of breeding activities (e.g., bats breed in autumn from August to October) or the possible direct destruction of bat roosts (e.g., trees, bridge structure). The application of mitigation measures described in Chapter II (e.g., Best Management Practices, limitation of bridge removal activities to outside the breeding season for special- status bats) and inclusion of a bridge design that allows bat roosting and would reduce the potential adverse impacts to special- status bats to a negligible intensity. This timing would coincide with U.S. Army Corps of Engineers Section 404 permit requirements for demolition and construction activities to occur during a low- water time of year. Further, mitigation will include a bat survey by a qualified researcher prior to bridge demolition. In

addition, bat roosting habitat under the new bridge and revegetation would have a local, long-term, minor to moderate, beneficial effect on habitat for special- status bats at this location.

Special- Status Species of Birds and Mammals. Bridge removal activities would have a short- term, negligible to minor, adverse effect on special- status birds and mammals in the immediate vicinity of Wawona. Effects would be related to heavy equipment use and could include increased dust, vegetation removal, and noise. These actions could result in direct loss of next/perch sites, and indirect effects of disturbance to nesting or foraging special- status birds. These impacts would also be anticipated for the Pacific fisher, the only special- status mammal considered in detail, which uses trees in coniferous forests for hunting or escaping predators. The application of mitigation measures described in Chapter II, Best Management Practices, would further reduce the potential adverse impacts to vegetation that may support special- status birds or mammals.

As described under the impacts to vegetation for Alternative 2, long- term benefits are anticipated for wetland, riparian, and upland habitats. The benefit to these habitats would result in long-term, negligible to minor, beneficial effects to special- status bird and mammal species. The extent and quality of habitat for these species throughout the remainder of the South Fork Merced River corridor would be unaffected.

Special- Status Species of Plants. Removal/construction of the South Fork Bridge would have local, short- term, negligible, adverse effects on habitat suitable for special- status plants, including Small's southern clarkia, Rawson's flaming trumpet, and the Yosemite lewisia. Approximately 0.75 acre of upland habitat and 0.27 acre of sparse scrub- shrub wetland that may support habitat for these species are anticipated to be disturbed. The upland area is dominated by native and non- native herbaceous species and includes the existing temporary road that was constructed across an informal parking area devoid of vegetation. The wetland area is dominated by willows and sedges (approximately 15% foliar cover). Effects would result from heavy equipment and demolition/construction activities, including cofferdam placement, and would include soil disturbance, soil compaction, dust, vegetation removal, root damage to adjacent vegetation, and potential introduction and spread of non- native species. Because construction/demolition activities would be conducted in a controlled manner (e.g., within a delineated work area and with the application of Best Management Practices and mitigation measures described in Chapter II, Best Management Practices), Alternative 2 would avoid the more pronounced adverse effects of debris retrieval activities described under Alternative 1.

As described under the impacts to vegetation for Alternative 2, long- term benefits are anticipated for wetland, riparian, and upland habitats. The benefit to these habitats would result in long-term, negligible to minor, beneficial effects to potential habitat for special- status plants. The extent and quality of habitat for these species throughout the remainder of the South Fork Merced River corridor would be unaffected.

Summary of Alternative 2 Impacts

Local, negligible to minor, short- term, adverse impacts to special- status species are expected during bridge removal. Removal of the South Fork Bridge would restore the free- flowing condition of the river and return this reach to a more natural state, thereby enhancing the biological integrity for the Wawona riffle beetle, and resulting in a local, long- term, minor to moderate, beneficial effect on habitat for special- status bats at this location. Local, long- term, negligible to minor, beneficial effects on habitat for special- status birds, mammals, and plants are also anticipated.

Cumulative Impacts

The cumulative impact analysis for special- status species in Alternative 2 is the same as described under the No Action Alternative. Please see discussion of cumulative impacts under Alternative 1.

Cumulative actions would have a local, long- term, moderate, beneficial, cumulative effect on special- status species within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net local, long- term, minor to moderate, beneficial effect on habitat for the Wawona riffle beetle and special- status species of bats, birds, mammals, and plants.

Conclusions

Removal of the South Fork Bridge would restore the free- flowing condition of the river and return this reach to a more natural state enhancing the biological integrity of the reach for the Wawona riffle beetle and resulting in a local, long- term, negligible to minor, beneficial effect on habitat for other special- status species at this location. Alternative 2 would result in site- specific, short- term, negligible, adverse, effects during bridge removal. Cumulative actions would have a local, long- term, moderate, beneficial, cumulative effect on special- status species within the South Fork Merced River corridor. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net local, long- term, moderate, beneficial effect for the Wawona riffle beetle and special- status bats, birds, mammals, and plants within this river reach.

Impairment

Given the incorporation of mitigation measures into the design of this alternative, Alternative 2 would result in a local, long- term, negligible to minor, beneficial impact to the Wawona riffle beetle and other special- status species. Alternative 2 would not impair special- status species.

Air Quality

Analysis

Under Alternative 2, local pollution sources within the park, and regional sources upwind of the park, would continue to have an impact on air quality at Yosemite, as discussed in Alternative 1.

Over the short term, the South Fork Bridge removal/construction, including removal of the temporary Bailey bridge, would result in local, negligible, adverse impacts to air quality. Effects would be primarily related to the use of equipment, dust, and vehicle trips to and from the demolition/ construction site and exhaust emissions. As described for bridge debris removal in Alternative 1, demolition/construction activities would temporarily affect pollutant concentrations in the vicinity of the South Fork Bridge, but would not affect the attainment area status. Air quality impacts would be primarily from: (1) fugitive dust associated with the demolition/construction and vehicle travel over paved surfaces heavily laden with earthen materials; (2) tailpipe emissions associated with demolition/construction equipment; and (3) emissions of ozone precursors and carbon monoxide from the use of diesel- powered equipment. Dust emissions would vary from day to day, depending on the level and type of activity, silt content of the soil, and the weather. These impacts would be mitigated through Best Management Practices described for the Preferred Alternative in this environmental assessment. Because demolition/construction would occur in a controlled manner, working within a delineated area and using Best Management Practices, Alternative 2 would avoid the more extensive adverse

effects of bridge debris removal activities described under Alternative 1. Therefore, Alternative 2 would have a local, short- term, negligible, beneficial effect on air quality compared to Alternative 1. Alternative 2 would not result in a long- term impact to air quality as the construction related activities would be short term and the overall traffic flow would be restored.

At the South Fork Bridge site during construction activities, automobile and recreational vehicle traffic would continue to be slowed due to the speed and size limitations of the existing temporary Bailey bridge, resulting in negligible to minor, short- term, adverse impacts on local air quality, depending on the time of year (i.e., more traffic exists during the summer months, causing more congestion), meteorological conditions (e.g., wind speed, wind direction), and the type of vehicles (automobile versus recreational vehicle) crossing the temporary bridge. However, when the new South Fork Bridge is complete, and replaces the temporary Bailey bridge, traffic would be able to pass through this area more smoothly, at a higher rate of speed. This would result in local, long- term, negligible to minor, beneficial effects on air quality.

Summary of Alternative 2 Impacts

Because demolition/construction of the South Fork Bridge (including removal of the temporary Bailey bridge) would occur in a controlled manner, working within a delineated area, Alternative 2 would avoid the more extensive adverse effects of bridge debris removal activities described under Alternative 1. Therefore, Alternative 2 would have a local, short- term, negligible to minor, beneficial effect on air quality compared to Alternative 1. Short- term, local, negligible to minor, adverse impacts would also be anticipated from vehicles having to slow down to cross the temporary Bailey bridge. Alternative 2 would not result in a long- term impact to air quality as traffic movement would be restored. The long- term impact would be local, negligible to minor, and beneficial to air quality.

Cumulative Impacts

The cumulative impact analysis for air quality in Alternative 2 is the same as described under the No Action Alternative. Please see the discussion of cumulative impacts under Alternative 1 for a detailed description.

The *Yosemite Valley Plan* has identified management actions to reduce the number of passenger vehicles within the park. The major actions identified include off- park parking areas, an expanded shuttle service, two- way traffic on currently one- way roads, road closures, and a 50% reduction of daily vehicle trips to the east valley. YARTS is a collaborative effort to improve transportation options, reduce reliance on automobiles and improve regional air quality. The overall cumulative effect of these management actions, when employed, would result in local and regional, short- and long- term, beneficial effects to air quality.

Considered with the adverse impacts associated with regional air quality influences, the cumulative projects would have a local, long- term, minor beneficial effect on air quality near the South Fork Bridge. The short- term, adverse effects associated with demolition/construction activities under Alternative 2 would not offset the long- term, beneficial effects of the cumulative projects.

Conclusions

Local, short- term, negligible to minor, adverse impacts are anticipated from demolition/ construction of the South Fork Bridge, as a result of demolition/construction activities (including removal of the temporary Bailey bridge) and increased congestion from vehicles slowing down to cross the temporary Bailey bridge. However, in the long- term, the project would have local,

negligible to minor, beneficial impacts on air quality, as the new South Fork Bridge would alleviate some congestion, allowing vehicles to travel smoothly through the area at a higher speed.

Considered with the adverse impacts associated with regional air quality influences, the cumulative projects would have a local, long- term, minor, beneficial effect on air quality near the South Fork Bridge. The short- term, adverse effects associated with demolition/construction activities under Alternative 2 would not offset the long- term, beneficial effects of the cumulative projects.

Impairment

Alternative 2 would result in negligible effects to air quality. Air quality impacts would be small and would not impair park resources or values.

Noise

Analysis

Over the short term, the South Fork Bridge removal/construction, as well as removal of the temporary Bailey bridge, would result in local, short- term, minor to moderate, adverse impacts to the ambient noise environment. Bridge cutting (concrete saw) and removal activities would generate the highest noise levels. Demolition/construction- related material haul trips would also raise ambient noise levels along haul routes. Operation of heavy- duty equipment at the site during demolition/ construction (including removal of the temporary Bailey bridge) could generate substantial amounts of noise and would occur within close proximity to visitor use areas. Other sensitive land uses (e.g., campgrounds and picnic areas, the Wawona Hotel, the Pioneer Yosemite History Center, and the Wawona Golf Course) located farther from the site would be affected to a lesser extent. Noise at the site would vary depending on a number of factors, such as the number and types of equipment in operation on a given day, usage rates, the level of background noise in the area, and the distance between sensitive uses and the construction site.

Alternative 2 would avoid the more extensive, adverse noise impacts associated with bridge debris removal activities under Alternative 1, by working within a delineated area. Therefore, Alternative 2 would have a local, short- term, negligible, beneficial effect on the ambient noise environment when compared to Alternative 1.

At the South Fork Bridge site, automobile and recreational vehicle traffic would continue to be slowed due to the speed and size limitations of the existing temporary Bailey bridge. This can cause negligible to minor, short- term, adverse impacts on the local ambient noise environment, depending on the time of year (i.e., more traffic exists during the summer months, causing more congestion), meteorological conditions (e.g., wind speed, wind direction), and the type of vehicles (automobile versus recreational vehicle) crossing the temporary bridge. However, when the new South Fork Bridge is complete, and replaces the temporary Bailey bridge, traffic would be able to pass through this area more smoothly, at a higher rate of speed. This would result in local, long- term, negligible to minor, beneficial impacts on the local noise environment, depending on the time of year, meteorological conditions, and types of vehicles crossing the new bridge.

Over the long term, the acoustical environment in the vicinity of the South Fork Bridge would be shaped largely by natural sources of sound (e.g., rushing water and wind), interspersed with human- caused sources of noise (e.g., motor vehicles, talking and yelling, and aircraft).

Summary of Alternative 2 Impacts

Although demolition/construction of the South Fork Bridge (including removal of the temporary Bailey bridge) is anticipated to have short- term, local, adverse impacts on the noise environment, Alternative 2 would avoid the more extensive adverse noise impacts associated with bridge debris removal activities under Alternative 1 by working within a delineated area. Therefore, Alternative 2 would have a local, short- term, negligible, beneficial effect on the ambient noise environment when compared to Alternative 1.

Cumulative Impacts

The cumulative impact analysis for noise in Alternative 2 is the same as described under the No Action Alternative. Please see the discussion of cumulative impacts under Alternative 1 for a detailed description.

The *Yosemite Valley Plan* has identified management actions to reduce the number of passenger vehicles within the park. The major actions identified include off- park parking areas, an expanded shuttle service, two- way traffic on currently one- way roads, road closures, and a 50% reduction of daily vehicle trips to the east valley. The overall cumulative effect of these management actions, when employed, would result in local and regional, short- and long- term, moderate, beneficial effects related to noise generation. Short- term construction projects associated with the *Yosemite Valley Plan*, such as construction of employee housing and improvements at Wawona Campground will likely result in minor to moderate, adverse impacts to noise.

The gradual increase in annual visitation to the park as well as the potential for increased passenger vehicle traffic in this area as a result of road closures elsewhere would likely offset the beneficial effects of cumulative actions that would tend to reduce vehicle trips and their associated noise. Alternative 2 would, therefore, contribute to the local, short- and long- term, minor, adverse, cumulative effect on the noise environment near the South Fork Bridge. The local, long- term, beneficial impacts of Alternative 2 on the ambient noise environment would not offset the cumulative adverse effects.

Conclusions

Although demolition/construction of the South Fork Bridge (including removal of the temporary Bailey bridge) is anticipated to have short- term, local, adverse impacts on the noise environment, Alternative 2 would avoid the more extensive adverse noise impacts associated with bridge debris removal activities under Alternative 1, by working within a delineated area. Therefore, Alternative 2 would have a local, short- term, negligible, beneficial effect on the ambient noise environment when compared to Alternative 1.

The gradual increase in annual visitation to the park would likely offset the beneficial effects of cumulative actions that would tend to reduce vehicle trips and their associated noise. Alternative 2 would therefore contribute to the local, short- and long- term, minor, adverse, cumulative effect on the noise environment near the South Fork Bridge. The local, long- term, beneficial impacts of Alternative 2 on the ambient noise environment would not offset the cumulative adverse effects. The gradual increase in annual visitation to the park would likely offset the beneficial effects of cumulative actions that would tend to reduce vehicle trips and their associated noise. Alternative 2 would, therefore, contribute to the local, short- and long- term, minor, adverse, cumulative effect on the noise environment near the South Fork Bridge. The local, long- term, beneficial impacts of Alternative 2 on the ambient noise environment would not offset the cumulative adverse effects. However, when the *Yosemite Valley Plan* becomes fully

implemented and daily vehicle trips are reduced by 50% on the busiest days, the plan would result in local and regional, short- to long- term, moderate, beneficial impacts to the noise environment.

Impairment

Alternative 2 would result in negligible beneficial effects on the ambient noise environment. Noise impacts would not be considered severe and would not impair park resources or values.

Cultural Resources

Archeological Resources

Analysis

Archeological resources in the Wawona area include historic and prehistoric resources. Archeological resource site CA- MRP- 171/H, which contains prehistoric and historic artifacts occurs within the immediate project area. If ground- disturbing activities are confined to the defined area of potential effect, moderate adverse effects to archeological resources would be expected. However, data recovery has previously been undertaken for the area of potential effect and reduces the effect of bridge replacement to negligible to minor. If ground- disturbing activities are confined to the defined area of potential effect, there would be no new adverse effects to archaeological resources.

Removal/replacement of the South Fork Bridge could unearth sensitive prehistoric and possibly historic archeological resources, although there is low probability of unknown archeological resources or prehistoric or historic archeological resources in the project area. Ground-disturbing activities could result in a local, long- term, minor, adverse impact to unknown archaeological resources within the project area. If discovered, data recovery would be conducted for these resources. Minor revegetation would increase bank integrity and decrease potential erosion, therefore, avoiding adverse erosion- related effects that would result under Alternative 1. Any actions would be performed in accordance with stipulations in the park's 1999 Programmatic Agreement. Archeological resources throughout the remainder of the Wawona area would be unaffected.

Summary of Alternative 2 Impacts

Alternative 2 could have a local, long- term, minor, adverse impact to unknown archeological resources due to ground- disturbing activities. Any and all actions would be performed in accordance with stipulations in the park's 1999 Programmatic Agreement.

Cumulative Impacts

Because the direct and indirect effects of this alternative are minimal, the cumulative impact analysis for archeological resources in Alternative 2 is the same as described for the No Action Alternative. Essentially, Alternative 2 and the cumulative projects with and in the vicinity of the South Fork Merced River could result in a local, long- term, negligible, beneficial impact on archeological resources.

Section 106 Summary. The potential level of adverse effects associated with the Preferred Alternative would be minimized or avoided through the use of archeological and American Indian monitors and implementation of other mitigating measures, as necessary. All mitigation would be

implemented in consultation with the California State Historic Preservation Office and American Indian tribes, as appropriate. After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5), the National Park Service determined there would be no adverse effect on archeological resources in the project area.

Conclusions

Alternative 2 could have a local, long- term, negligible to minor, adverse impact to archeological resources due to ground- disturbing activities. Any actions would be performed in accordance with stipulations in the park's 1999 Programmatic Agreement. The reason that this impact is considered negligible to minor is because at this stage the archeological site (CA- MRP- 171H) has already been the subject of a data recovery plan implemented under the guidance of the California State Historic Preservation Office and there is a low probability that other archeological resources are in the project area.

Impairment

Disturbance of historic and prehistoric archeological resources could take place during bridge demolition and construction under Alternative 2. This action would be subject to site- specific planning and compliance and would be undertaken in accordance with stipulations in the park's 1999 Programmatic Agreement. Therefore, this alternative would not impair park resources or values.

Ethnographic Resources

Analysis

There are traditionally gathered plant species present in the South Fork Bridge locality, including willows, sedges, mosses, and grasses among other species. Under Alternative 2, the impacts would be less than those described under the No Action Alternative, because downstream vegetation impacts would be averted. Overall, Alternative 2 would result in a local, negligible, adverse impact to traditional plant gathering activities in the immediate vicinity of the South Fork Bridge. The National Park Service would continue to consult with culturally associated groups throughout the environmental process.

Summary of Alternative 2 Impacts

Alternative 2 would result in local, short- and long- term, negligible, adverse impacts to ethnographic resources, i.e., plant species gathered by American Indian people, in the immediate vicinity of the South Fork Bridge.

Cumulative Impacts

The cumulative impact analysis for ethnographic resources, under Alternative 2, is related to traditionally gathered plant species and is the same as described under the No Action Alternative. Please see discussion of cumulative impacts under Alternative 1. The cumulative projects in the South Fork Merced River corridor would result in a local, long- term, negligible to minor, adverse impact on ethnographic resources due to the disturbance of such resources. Alternative 2 actions would not provide additional contributions to this impact.

Conclusions

Alternative 2 would result in local, short- and long- term, negligible, adverse impacts to traditionally gathered plant species in the immediate vicinity of the South Fork Bridge. Cumulative actions would have a local, long- term, negligible, beneficial effect on these resources within the South Fork Merced River corridor due to vegetation resource protection and management. Past cumulative actions have had a local, long- term, moderate, adverse, cumulative effect on traditionally gathered plant resources within the South Fork Merced River corridor due to historic development. Thus, past, present, and reasonably foreseeable future actions, in combination with Alternative 2, would have a net long- term, minor, adverse effect on traditionally gathered plant distribution patterns.

In general, there would be no change in the treatment and management of ethnographic resources as a result of Alternative 2. Any site- specific planning and compliance actions would be accomplished in accordance with stipulations in the 1999 Programmatic Agreement and the park would continue to consult with culturally associated American Indian tribes under this agreement and the cooperative agreement for traditional uses. The cumulative projects in the Wawona area, in addition to Alternative 2, could result in a local, long- term, minor, adverse impact on ethnographic resources.

Impairment

Alternative 2 would not have a direct, indirect, or cumulative impact on ethnographic resources or their treatment and management. This alternative would result in a local, long- term, negligible, beneficial effect on traditionally gathered plant species in the immediate vicinity of the South Fork Bridge. Ethnographic resources throughout the Wawona area would not be affected. This alternative would not impair park resources or values.

Cultural Landscape Resources, Including Historic Sites and Structures

Analysis

Under Alternative 2, all cultural landscape resources, historic sites, and structures would continue to be managed as they are currently. The South Fork Bridge is not a contributing element due to changes made to the bridge that compromised the original architecture. The project poses no adverse impact to significant historic resources, such as designed landscapes and developed areas, historic buildings, and circulation systems (trails, roads, bridges) throughout the remainder of the Wawona area.

Summary of Alternative 2 Impacts

Nationally significant historic resources, such as designed landscapes and developed areas, historic buildings, and circulation systems (trails, roads, and bridges), throughout the Wawona area would be unaffected by project activities. There would be no change in the treatment and management of cultural landscape resources as a result of Alternative 2.

Cumulative Impacts

Because there are no direct or indirect effects of Alternative 2, the cumulative impact analysis for cultural landscape resources under this alternative is the same as described under Alternative 1. Reasonably foreseeable future actions in the region that may have an adverse cumulative effect on cultural landscape resources include development- related projects, such as implementation of

removal and construction activities associated with the Wawona Campground improvements and employee housing construction.

None of these projects are expected to affect the qualities of the cultural landscape in the core Wawona area. The cumulative projects in the Wawona area would result in no change in the cultural landscape resources.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's criteria of adverse effect (36 CFR 800.5), the National Park Service determined there would be no adverse effect to the structures at cultural landscape resources. The overall characteristics and integrity of the landscape would be retained.

Conclusions

There would be no change to cultural landscape resources as a result of Alternative 2 or the cumulative effect of other projects and Alternative 2.

Impairment

Alternative 2 would result in a local, long- term, minor, beneficial impact to historic resources. Consequently, Alternative 2 would not impair park resources or values.

Social Resources

Socioeconomics

Analysis

Under Alternative 2, direct spending on labor and equipment would result, and a contractor would be needed to conduct the demolition and construction of the South Fork Bridge, including removal of the temporary Bailey bridge. Local and regional, short- term, negligible to minor, beneficial impacts to socioeconomics would occur for Wawona and/or Mariposa County as a result. These impacts would result from construction workers acquiring food, lodging, gasoline, and other services, as well as from revenue paid to construction contractors, material (e.g., concrete, steel) suppliers, and disposal/recycling facilities selected for use. These beneficial effects would be greater under Alternative 2, when compared to Alternative 1, because: (1) more workers would be required for a longer period of time for bridge demolition and construction, including removal of the temporary Bailey bridge; (2) material suppliers are not needed in the No Action Alternative; and (3) an increase in materials for disposal/recycling would likely be associated with Alternative 2.

Summary of Alternative 2 Impacts

Alternative 2 would have direct and indirect economic impacts, which would result in a local and regional, short- term, negligible to minor, beneficial impact to the socioeconomics of Wawona and/or Mariposa County.

Cumulative Impacts

The cumulative impact analysis for socioeconomics under Alternative 2 is similar to that described under the No Action Alternative. Please see the discussion of cumulative impacts under Alternative 1 for a detailed description. Alternative 2 would contribute to all of the identified cumulative plans and projects in the South Fork Merced River corridor and Yosemite Valley, resulting in local, short- and long- term, minor to moderate, beneficial impacts to socioeconomics. Alternative 2 would contribute to this local, short- term, beneficial impact due to temporary spending on bridge removal and construction activity.

Conclusions

Alternative 2 would have direct and indirect economic impacts, which would result in a regional, short- term, negligible to minor, beneficial impact to the socioeconomics of Wawona and/or Mariposa County. Beneficial impacts are anticipated from construction workers acquiring food, lodging, gasoline, and other services, as well as from an influx of revenue to construction contractors, material (e.g., concrete, steel) suppliers, and disposal/recycling facilities selected for use. These beneficial effects would be greater under Alternative 2 than under Alternative 1.

The cumulative projects within and in the vicinity of Yosemite National Park would result in a local, long- term, negligible, beneficial impact to the regional economy, and a local, short- term, minor to moderate, beneficial impact during construction. Alternative 2 would contribute to this local, short- term, beneficial impact due to temporary spending on bridge removal construction activity.

Impairment

Socioeconomic resources are not subject to the National Park Service Organic Act and thus, the impairment standard does not apply to this impact topic.

Transportation

Analysis

Under Alternative 2, removal and construction of the South Fork Bridge would have local, short-term, negligible, adverse impacts on transportation and traffic circulation within the park. Given that the temporary Bailey bridge is in place to carry traffic, the demolition/construction of the South Fork Bridge would not preclude visitors, park employees, or concessioners from using Wawona Road. However, demolition/construction activities, including the eventual removal of the temporary Bailey bridge, could cause traffic delays, anticipated to be 30 minutes or less. Construction access to the South Fork Bridge would be provided along Chilnualna Falls Road and Forest Drive. This could cause delays along these routes, while trucks or other equipment accessing Wawona Road, or the placement of equipment in the road, would add a small amount to the minor to moderate congestion experienced on the busiest summer days.

Transit and tour bus services to the park from points south, which travel through Wawona, as well as park tours from Yosemite Valley to Wawona and the Mariposa Grove of Giant Sequoias, could also be affected by traffic delays associated with bridge demolition/construction (including removal of the temporary Bailey bridge). These would also be localized, short- term, negligible, adverse impacts, as the bus tour from Yosemite Valley to Wawona operates only during the summer. Impacts from demolition/construction delays would not be expected to be as widespread when compared to Alternative 1. Bridge demolition/construction activities would occur in a controlled manner and in a delineated area under Alternative 2.

The unpaved parking area in the southwest quadrant of the project site, which serves as informal overflow parking for the paved shuttle bus parking area, would be used for equipment staging during demolition/construction of the South Fork Bridge. Closure of this parking lot to privately owned vehicles would have local, short- term, minor, adverse impacts on the availability of parking near the South Fork Bridge. However, in the long term, the demolition/construction of the South Fork Bridge would reduce congestion by allowing increased speed at which vehicles could cross this bridge, resulting in a local, negligible, beneficial impact to transportation.

Summary of Alternative 2 Impacts

Demolition/construction of the South Fork Bridge (including removal of the temporary Bailey bridge) could create traffic delays that would add to the congestion experienced on the busiest summer days, resulting in local, short- term, minor, adverse impacts to transportation, including transit and tour bus services, under Alternative 2. Closure of the informal shuttle bus parking overflow lot to privately owned vehicles would have local, short- term, minor, adverse impacts to the availability of parking near the South Fork Bridge, as in Alternative 1. However, in the long term, the demolition/ construction of the South Fork Bridge would reduce congestion by allowing increased speeds at which vehicles could cross this bridge, resulting in a negligible, local, beneficial impact to transportation.

Cumulative Impacts

The cumulative impact analysis for transportation in Alternative 2 is the same as described under the No Action Alternative and is based on reasonably foreseeable future actions in the *Yosemite Valley Plan* and implementation of YARTS. Please see the discussion of cumulative impacts under Alternative 1 for a detailed description.

The *Yosemite Valley Plan* has identified management actions to reduce the number of passenger vehicles within the park. The major actions identified include off- park parking areas, an expanded shuttle service, two- way traffic on currently one- way roads, road closures, and a 50% reduction of daily vehicle trips into the east valley. YARTS is a collaborative effort to improve transportation options and reduce reliance on automobile travel. The overall cumulative affect of these management actions, when employed, would result in local and regional, short- and long-term, minor to moderate, beneficial effects on transportation by reducing traffic congestion. Locally, the closure of roads in the east valley may increase private vehicle traffic in the project area. If private vehicle traffic increases, the long- term effects will be minor to moderate and adverse.

The gradual increase in annual visitation to the park would somewhat offset the beneficial effects of cumulative actions that would tend to reduce vehicle trips and their associated transportation issues, particularly during the peak of visitation. Alternative 2 would, therefore, contribute to the local, short- term, minor, adverse, cumulative effect on the transportation, traffic, and parking situation near the South Fork Bridge.

Conclusions

Demolition/construction of the South Fork Bridge (including removal of the temporary Bailey bridge) could create traffic delays that would add to the minor to moderate congestion experienced on the busiest summer days. Under Alternative 2, this would result in local, short-term, adverse impacts on transportation, including transit and tour bus services. Closure of the shuttle bus parking overflow lot to privately owned vehicles would have local, short- term, minor, adverse impacts on the availability of parking near the South Fork Bridge, as in Alternative 1. However, in the long term, the demolition/ construction of the South Fork Bridge would reduce

congestion by allowing increased speed at which vehicles could cross this bridge, resulting in a local, negligible, beneficial impact to transportation.

The gradual increase in annual visitation to the park would somewhat offset the beneficial effects of cumulative actions that would tend to reduce vehicle trips and their associated transportation issues. Alternative 2 would, therefore, contribute to the local, short- term, minor, adverse, cumulative effect on the transportation, traffic, and parking situation near the South Fork Bridge.

Impairment

Impairment is not addressed in the transportation analysis because this resource topic is peripheral to the protection of the park for future generations.

Visitor Experience

Consistency with VERP this alternative does not include any actions that would be provisions inconsistent with the interim VERP framework.

Recreation

Analysis. The controlled demolition of the South Fork Bridge under Alternative 2 would avoid the potential for serious injuries and/or fatalities to recreational and pedestrian users of the bridge and river associated with a sudden, catastrophic failure of the bridge. Avoidance of hazards to recreational users of the river would be a local, long- term, major, beneficial impact when compared to Alternative 1. However, short- term, local, negligible to minor, adverse impacts could occur to recreational river users should the stretch of river downstream from the South Fork Bridge be closed due to an unplanned, potentially dangerous situation.

Debris deposited in the river channel and sedimentation during bridge demolition/construction, including removal of the temporary Bailey bridge, would be controlled to the extent feasible. This should eliminate the potential for temporary degradation of water quality and the alteration of water flows that could adversely affect active recreational pursuits (e.g., swimming, fishing) in the vicinity of the South Fork Bridge. When compared to Alternative 1, this would result in a local, short- term, minor, beneficial impact on river- dependent active recreational uses.

Alternative 2 would also avoid the impacts on passive recreation activities identified for Alternative 1. Specifically, Alternative 2 would avoid the visually intrusive effects of damage to riverbanks, riparian vegetation loss, and deposition of debris in the river channel that would result from failure of the bridge under Alternative 1. However, short- term, adverse impacts to passive activities such as sightseeing would be expected from the operation of heavy equipment to remove and construct the South Fork Bridge. These impacts are addressed in detail in the Scenic Resources impact analysis section.

Alternative 2 would include plans for incorporating a 5- foot sidewalk into bridge designs. This sidewalk would allow for the safe passage of pedestrians and cyclists, and add an additional location for sightseeing and photography. This would have a long- term, local, negligible, beneficial impact on recreation in the vicinity of the South Fork Bridge.

Under Alternative 2, bridge removal and construction could temporarily interfere with river-related recreation (e.g., fishing, rafting), as well as other recreational opportunities, due to the temporary closure of the river and/or trails (for pedestrians, stock users, or, during winter, cross-country skiers). Construction access to the South Fork Bridge would be provided along Chilnualna Falls Road and Forest Drive. Visitors, park staff, residents, and concessioners seeking

to use these routes may be delayed so workers can safely move trucks and heavy equipment into the demolition/construction area. Under Alternative 2, demolition/construction would be controlled and confined to a delineated area to the extent feasible, having less of an impact on recreation activities than Alternative 1. This would result in a short- term, local, negligible, adverse effect on pedestrian activities in the bridge vicinity, although it would be a beneficial impact when compared to Alternative 1.

Summary of Alternative 2 Impacts. Avoidance of hazards (the potential for serious injury and/or fatality) to recreational users of the river would be a local, long- term, major, beneficial impact when compared to Alternative 1. However, short- term, local, negligible to minor, adverse impacts could occur to recreational river users should the stretch of river downstream from the South Fork Bridge be closed due to an unplanned, potentially dangerous debris situation. These impacts are addressed in detail in the Scenic Resources impact analyses section.

Alternative 2 would include plans for incorporating a 5- foot sidewalk into bridge designs. This would have a long- term, local, negligible, beneficial impact on recreation in the vicinity of the South Fork Bridge. Under Alternative 2, bridge removal and construction could temporarily interfere with river- related recreation (e.g., fishing, rafting), as well as other recreational opportunities, due to the temporary closure of the roads, the river, and/or trails (for pedestrians, livestock users, or, during winter, cross- country skiers).

Cumulative Impacts. The cumulative impact analysis for recreation in Alternative 2 is the same as described under the No Action Alternative. Please see the discussion of cumulative impacts under Alternative 1 for a detailed description. The cumulative effects of Alternative 2, when considered with these past, present, and reasonably foreseeable future actions, are expected to be local, minor to moderate, beneficial impacts in the long term. The short- term, adverse impacts of Alternative 2 on recreation would not offset the long- term beneficial effects of the cumulative plans or projects.

Conclusions. Avoidance of hazards (the potential for serious injury and/or fatality) to recreational users of the river would be a local, long- term, major, beneficial impact when compared to Alternative 1. However, short- term, local, negligible to minor, adverse impacts could occur to recreational river users should the stretch of river downstream from the South Fork Bridge be closed due to an unplanned, potentially dangerous debris situation. These impacts are addressed in detail in the Scenic Resources impact analysis section.

Alternative 2 would include plans for incorporating a 5- foot sidewalk into bridge designs. This would have a long- term, local, negligible, beneficial impact on recreation in the vicinity of the South Fork Bridge. Under Alternative 2, bridge removal and construction could temporarily interfere with river- related recreation (e.g., fishing, rafting), as well as other recreational opportunities, due to the temporary closure of the roads, the river, and/or trails (for pedestrians, livestock users, or, during winter, cross- country skiers). However, under Alternative 2, demolition/construction would be controlled and confined to a delineated area to the extent feasible, having less of an impact on recreation activities than Alternative 1. Therefore, this would result in a short- term, local, negligible, adverse effect on pedestrian activities in the bridge vicinity, although it would be a beneficial impact when compared to Alternative 1. Long- term effects may be minor to moderate and could be beneficial or adverse, depending on the extent to which public transportation eases traffic congestion or closures in the east valley encourage more private vehicles in this area.

The cumulative effects of Alternative 2, when considered with these past, present, and reasonably foreseeable future actions, are expected to be local, minor to moderate, beneficial impacts in the long- term. The short- term, adverse impacts of Alternative 2 would not offset the long- term beneficial effects of the cumulative plans or projects.

Impairment. Alternative 2 would result in local, short- and long- term, minor to major, beneficial impacts on river- related recreation activities from the elimination of hazards associated with catastrophic bridge failure discussed in Alternative 1. Coupled with other beneficial effects (e.g., decreased sedimentation and debris deposition, provisions for a sidewalk on the new bridge) under Alternative 2, the benefits of this alternative offset the short- term, local, negligible, adverse effects that would also be expected. Therefore, Alternative 2 would not impair river- related recreational opportunities.

Scenic Resources

Analysis

Under Alternative 2, removal/replacement of the South Fork Bridge would have local, short-term, adverse, demolition/construction- related effects to scenic resources in the Wawona area. Removal of the existing structure would occur from September to December of 2003. If removal is not completed during that period, in- channel activities could resume in the summer of 2004 during low- flow periods. Removal of the bridge would avoid the adverse scenic resource impacts associated with the structure remaining in place, deteriorating over time, and likely having an uncontrolled failure under Alternative 1. Alternative 2 would avoid the adverse effect of a deteriorating structure, deposition of bridge debris in the river channel, and the associated gouging of the banks and channel, which would damage vegetation. In addition to removal and replacement of the condemned bridge, Alternative 2 would result in the removal of the temporary Bailey bridge that is considered a visual intrusion due to size, construction materials, color, and restoration of the project site, resulting in a local, long- term, minor, beneficial impact on scenic resources of the Wawona area.

Like Alternative 1, Alternative 2 would require the use of heavy equipment to remove and transport bridge materials from the existing site. The presence and operation of the equipment would detract from the scenic resource values of the South Fork Merced River corridor at Wawona. However, because bridge removal activities would be planned and controlled under Alternative 2, it is likely that bridge removal and equipment transport would occur over a shorter period of time and within a more limited area of the river corridor than would be the case under Alternative 1. Accordingly, in avoiding the effects associated with uncontrolled bridge failure under Alternative 1, Alternative 2 would have a local, short- term, minor, beneficial impact.

Efforts would be made to preserve the trees and shrubs of the riparian corridor along the South Fork Merced River, particularly those in and near the construction zone in contrast to the damage likely to occur along the riverbanks under Alternative 1 due to uncontrolled failure of the bridge. Two very large ponderosa pines and one large incense- cedar are present adjacent to Angel Creek in the river- left zone, and these trees would be protected and preserved. As stated in the discussion of mitigation measures in Chapter II, damage to trees would be avoided and any trees so damaged would be repaired or replaced. Some trees will be removed to construct the wider replacement bridge. The impact associated with tree removal under Alternative 2 would be local, short term, negligible to minor, and beneficial, because site revegetation would mitigate individual tree loss by restoring natural landscape patterns at the project site.

The long- term effects of bridge removal would be beneficial under Alternative 2, whereas unsightly portions of the bridge structure could remain under the Alternative 1 scenario of uncontrolled collapse. Therefore, Alternative 2 would result in a local, long- term, negligible to minor, beneficial impact to scenic resources for the Wawona area.

Summary of Alternative 2 Impacts

In avoiding the effects associated with Alternative 1 (e.g., uncontrolled bridge failure, debris deposition in the river channel and riverbank and vegetation damage), Alternative 2 would have a local, short- term, minor, beneficial impact on scenic resources. In addition, removal of the existing condemned bridge, the temporary Bailey bridge, and restoration of the project site would result in a local, long- term, minor, beneficial impact to the scenic resources of the Wawona area, compared to Alternative 1.

Cumulative Impacts

The cumulative impact analysis for scenic resources under Alternative 2 is the same as described under the No Action Alternative. Please see the discussion of cumulative impacts under Alternative 1. Alternative 2 and the cumulative projects within and in the vicinity of the South Fork Merced River corridor would result in local, long- term, negligible to minor, beneficial impacts on scenic resources in the vicinity of Wawona. This is due to the avoidance of visually prominent debris and riverbank damage associated with Alternative 1 and the overall emphasis on natural resource protection and management in the Wawona area.

Conclusions

Alternative 2 would have a local, short- term, minor, beneficial impact on scenic resources because it would avoid the effects associated with Alternative 1 (e.g., uncontrolled bridge failure including debris deposition). The long- term effects of bridge removal and replacement and removal of the temporary bridge would result in a local, long- term, minor, beneficial impact to scenic resources compared to Alternative 1. Alternative 2 and the cumulative projects within and in the vicinity of the South Fork Merced River corridor would result in local, long- term, negligible to minor beneficial impacts on scenic resources. This is due to the avoidance of visually prominent debris and riverbank damage associated with Alternative 1 and the overall emphasis on natural resource protection and management in the Wawona area.

Impairment

Alternative 2 would have an overall beneficial impact on the visual landscape. Therefore, Alternative 2 would not impair scenic resources or values.

Park Operations and Facilities

Analysis

Under Alternative 2, the South Fork Bridge would be removed and a new bridge constructed to accommodate wider travel lanes, shoulders, and a new 5- foot- wide sidewalk. Additionally, the height of the safety railing would be raised to 2- feet 8- inches to meet present safety standards and eliminate the need for park operations staff to discourage pedestrian encroachments and prevent public access to the failing bridge. The potential for emergency bridge debris removal in the event of a catastrophic bridge failure would also be substantially reduced, i.e., it would be much less likely that an immediate and dramatic increase in demand for the full range of park operations and emergency personnel would occur. These changes would constitute a local, short- and long- term, moderate, beneficial effect on park operations. However, operations and emergency personnel would likely be needed to provide project oversight and emergency response under Alternative 2, resulting in less of an effect on park operations when compared to Alternative 1, having a local, short- term, local, negligible to minor, adverse impact.

Removal and reconstruction of the South Fork Bridge would require rerouting utility line conduits for water, sewage, electricity, and communications functions to the temporary Bailey bridge. When the new bridge was completed, the utility line conduits would be transferred to the permanent structure, and the temporary Bailey bridge would be removed. Barring any unforeseen complications in utility line transfer, demolition/construction of the South Fork Bridge, including removal of the Bailey bridge, would have a small impact on the operation of park facilities supported by these utilities. Therefore, short- term, local, negligible to moderate, adverse impacts to park operations and facilities could occur due to utility line transfer.

Summary of Alternative 2 Impacts

Local, short- and long- term, moderate, beneficial effects to park operations would result from eliminating safety hazards associated with pedestrian use of the condemned/closed South Fork Bridge, and substantially reducing the potential for a catastrophic bridge failure. However, local, short- term, negligible to minor, adverse impacts to park operations would be expected from park operations and emergency response staff providing project oversight. Short- term, local, negligible to moderate, adverse impacts to park operations and facilities would also be anticipated in the event of temporary disruption of utility lines carrying water, sewage, electricity, and communications functions.

Cumulative Impacts

The cumulative impact analysis for park operations in Alternative 2 is the same as described under the No Action Alternative. Please see the discussion of cumulative impacts under Alternative 1 for a detailed description. Overall, the past, present, and reasonably foreseeable future actions would have local, minor to moderate, adverse, cumulative impacts, when considered with Alternative 2, because of the increased demand on park operations, services, and facilities in the short term. The moderate, beneficial effects of Alternative 2 would not offset the adverse effects associated with the cumulative plans and projects. In the long- term improvement to park facilities and operations is expected to result in a moderate beneficial impact; however, ever increasing visitor use and aging of these facilities will eventually negate the beneficial impacts.

Conclusions

Alternative 2 would result in local, short- and long- term, moderate, beneficial impacts to park operations by eliminating safety hazards associated with pedestrian use of the condemned/closed South Fork Bridge, and substantially reducing the potential for a catastrophic bridge failure. However, local, short- term, negligible to minor, adverse impacts to park operations would be expected from park operations and emergency response staff providing project oversight. Local, short- term, negligible to moderate, adverse impacts to park operations and facilities would result due to temporary disruption of utility lines carrying water, sewage, electricity, and communications functions.

Overall, the past, present, and reasonably foreseeable future actions in combination with Alternative 2, would have local, minor to moderate, adverse cumulative impacts because of the increased demand on park operations, services, and facilities in the short term. The moderate, beneficial effects of Alternative 2 related to improved facilities would not offset the adverse effects associated with the cumulative projects in the short term. Improvements would have a long- term, moderate, beneficial impact, but this would eventually be negated by increased visitor use and aging.

Impairment

Impairment is not addressed under the park operations and facilities analysis because this resource topic is peripheral to the protection of the river for future generations.

Chapter V: Merced Wild and Scenic River

Introduction

During the 1960s, it was apparent that many American rivers were being dredged, dammed, diverted, and degraded at an alarming rate. In response, Congress established the Wild and Scenic Rivers Act in October 1968. A Wild and Scenic River is a river that possesses one or more Outstandingly Remarkable Values distinguishing it from all other rivers and qualifying it for protection. The goal for designation of a river as Wild and Scenic is to preserve its free- flowing character and its Outstandingly Remarkable Values.

Congress designated the Merced a Wild and Scenic River in 1987 to protect its free- flowing condition and to protect and enhance its Outstandingly Remarkable Values for the benefit and enjoyment of present and future generations (16 USC 1271- 1278). Designation provides the Merced River special protection under the Wild and Scenic Rivers Act and requires that managing agencies prepare a comprehensive management plan for the river and its immediate environment. The Merced Wild and Scenic River designation includes reaches of both the Merced River main stem and the South Fork Merced River within Yosemite National Park.

The National Park Service released the *Merced Wild and Scenic River Comprehensive Management Plan* (referred to as the Merced River Plan in this environmental assessment) in February 2001, which describes how the Merced Wild and Scenic River corridor will be managed. The Merced River Plan applies seven management elements to prescribe desired future conditions, typical visitor activities and experiences, and park facilities and management activities allowed in the river corridor.

This chapter evaluates the consistency of the proposed action with the Wild and Scenic Rivers Act and the management elements of the Merced River Plan, and includes the following sections:

- Overview of the Wild and Scenic Rivers Act
- Overview of the Merced River Plan and its management elements
- Analysis of the consistency of the proposed action with the Merced River Plan management elements

The Wild and Scenic River Act Section 7 Determination is included as Appendix B of this document.

Wild and Scenic Rivers Act

The Wild and Scenic Rivers Act (PL 90- 542, as amended) provides the following statement of policy:

> *It is hereby declared to be the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free- flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of*

> *present and future generations. The Congress declares that the established national policy of dam and other construction at appropriate sections of the rivers of the United States needs to be complemented by a policy that would preserve other selected rivers or sections thereof in their free- flowing condition to protect the water quality of such rivers and to fulfill other vital national conservation purposes.*

Under the Wild and Scenic Rivers Act, Outstandingly Remarkable Values are defined as those resources that are river- related and rare, unique, or exemplary in a regional or national context. The Wild and Scenic Rivers Act stipulates that these values are to be protected and enhanced and that each agency administering a segment of the Wild and Scenic Rivers System establish boundaries (an average of not more than 320- acres per mile on both sides of the river) and prepare a comprehensive management plan to provide for the protection of river values. The plan must address protection of resources, development of lands and facilities, user capacities, and other management practices necessary to achieve the purposes of the act, and the *Merced Wild and Scenic River Comprehensive Management Plan* fulfills this requirement.

Section 2 of the Wild and Scenic Rivers Act requires that designated rivers be classified and administered as Wild, Scenic, or recreational river segments, based on the condition of the river corridor at the time of boundary designation. The classification of a river segment indicates the level of development on the shorelines, the level of development in the watershed, and the accessibility by road or trail. Classifications are defined in the act as follows:

- *Wild river areas*: Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shoreline essentially primitive and waters unpolluted.

- *Scenic river areas:* Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

- *Recreational river areas*: Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

1987 Designation of the Merced Wild and Scenic River

Approximately 122 miles of the Merced River, including the South Fork Merced River, were placed within the National Wild and Scenic Rivers System (PL 100- 149, 1987 and PL 102- 432, 1992). The National Park Service administers approximately 81 miles of this river system flowing within Yosemite National Park and the El Portal Administrative Site (referred to as the Merced Wild and Scenic River in this environmental assessment). The U.S. Forest Service and the U.S. Bureau of Land Management administer the remaining 41 miles of the designated river. The Merced River Plan provides the policy direction by which the National Park Service will manage the 81 miles of river corridor within its jurisdiction.

Merced Wild and Scenic Rivers Section 7 Determination

Pursuant to the Wild and Scenic Rivers Act, the National Park Service must prepare a Section 7 determination on all proposed water resources projects. The South Fork Merced River Bridge Replacement Project is located within the bed and banks of the South Fork Merced River, and will affect the free- flowing condition of the river. Therefore, the Section 7 determination process has been completed. The Section 7 determination for the South Fork Merced River Bridge Replacement Project appears in Appendix B. The Section 7 determination process applies only to

the proposed action; as a result, the Preferred Alternative is the only alternative analyzed in the Section 7 determination.

Merced River Plan Overview

The purpose of the Merced River Plan is:

> *… to provide direction and guidance on how best to manage visitor use, development of lands and facilities, and resource protection within the river corridor. The National Park Service developed a series of planning goals to guide management decision- making in these areas. The Merced River Plan is a template against which project implementation plans will be judged to determine whether such projects will protect and enhance the values for which the Merced River was designated Wild and Scenic. As a result, the Merced River Plan provides general direction and guidance for future management decisions; it does not address the specific details of future projects.*

Merced Wild and Scenic River Management Elements

The Merced River Plan is programmatic and, therefore, does not specify detailed actions. The plan applies seven management elements to prescribe desired future conditions, typical visitor activities and experiences, and park facilities and management activities allowed in the river corridor. The management elements include: (1) boundaries, (2) classifications, (3) Outstandingly Remarkable Values, (4) the Wild and Scenic Rivers Act Section 7 determination process, (5) the River Protection Overlay, (6) management zones, and (7) the VERP framework. Each management element has been evaluated relative to the South Fork Bridge area and described in the Section 7 Determination attached as Appendix B. Please refer to the Merced River Plan for additional information. The entire Merced River Plan (NPS 2001a) can be viewed online at www.nps.gov/yose/planning.htm .

Analysis of Consistency with the Merced River Plan

This environmental assessment is based on the management elements prepared for the Merced River Plan. The South Fork Merced River Wild and Scenic River segment in which the South Fork Merced River Bridge Replacement Project would be implemented is Segment 7, Wawona area. For the purposes of this analysis of potential effects on Outstandingly Remarkable Values, the Preferred Alternative is compared to the No Action Alternative. The focus of the analysis is on long- term effects (e.g., effects that would last 10 years or more or would be permanent). Short-term effects are not addressed in this analysis unless they are of sufficient magnitude (having a substantial, highly noticeable influence) to warrant consideration.

The Preferred Alternative has been assessed with regard to (1) compatibility with boundaries; (2) compatibility with classifications; (3) protection and enhancement of Outstandingly Remarkable Values; (4) compatibility with the Wild and Scenic Rivers Act Section 7 determination process (Appendix B); (5) consistency with the River Protection Overlay; (6) consistency with management zoning; and (7) consistency with VERP. This Wild and Scenic Rivers Act analysis is required because the proposed project is within the Wild and Scenic River boundaries.

Protection and Enhancement of Outstandingly Remarkable Values

Pursuant to Section 10(a) of the Wild and Scenic Rivers Act, river managing agencies must protect and enhance Outstandingly Remarkable Values within the Wild and Scenic River corridor boundary. Uses that are consistent with this provision and that do not substantially interfere with public enjoyment and use of these values should not be limited (16 USC 1281[a]). Outstandingly Remarkable Values located outside the Wild and Scenic River corridor boundary must also be protected (NPS 2001).

Analysis of Outstandingly Remarkable Values is focused on segment- wide effects, not site-specific effects. Exceptions to the segment- wide guideline include site- specific activities that could have substantial effects, such as degradation of habitat of a river- related special- status species (a biological Outstandingly Remarkable Value) that is endemic to that location (e.g., Wawona riffle beetle).

To evaluate potential effects to Outstandingly Remarkable Values, actions that could degrade them on a segment- wide basis include those with effects discernable throughout the majority of the river segment, or effects that would be of sufficient magnitude to affect adjacent segments. For the purposes of this analysis, the following assumptions for each Outstandingly Remarkable Value of the Wawona area segment were made:

- *Scenic* – The analysis considers the specific features that are listed in the scenic Outstandingly Remarkable Value for the Wawona area segment, and potential effects to views are analyzed from the perspective of a person situated on the bridge, riverbank, or river.

- *Recreation* – The analysis considers effects to the opportunity to experience a spectrum of river- related recreational activities.

- *Biological* – The analysis focuses on effects to riparian areas and adjacent uplands, wetlands, low- elevation meadows, and other riverine areas that provide rich habitat for a diversity of river- related species.

  Cultural – The analysis considers effects to river- related cultural resources that are not intended to divert the free flow of the river and that are either eligible for or listed on the National Register of Historic Places, including archeological sites, which provide evidence of thousands of years of human occupation, and continuing traditional use. The analysis also considers effects on nationally significant historic resources, such as designated landscapes and developed areas, historic buildings, and circulation systems (trails, roads, and bridges) that provide visitor access to the sublime views of natural features that are culturally valuable.

- *Scientific* – The analysis considers the proposed action effects on the integrity of the South Fork Merced River, in context with the Merced Wild and Scenic River, as a scientific resource.

- *Geologic Processes/Conditions* – Wawona Segment 7 does not have a Geologic Processes/Conditions Outstandingly Remarkable Value.

- *Hydrologic Processes* – Wawona River Segment 7 does not have a Hydrologic Process Outstandingly Remarkable Value.

It is possible for Outstandingly Remarkable Values to be in conflict, or for an action to have beneficial impacts with regard to one Outstandingly Remarkable Value and adverse impacts with regard to another. The Merced River Plan recognizes this possibility, as follows:

> *Actions must protect all Outstandingly Remarkable Values, regardless of where they are located. When Outstandingly Remarkable Values lie within the boundary of the Wild and Scenic River, the value must be protected and enhanced. When values are in conflict with one another, the net effect to Outstandingly Remarkable Values must be beneficial.*

The Wild and Scenic Rivers Act stipulates that agencies are given discretion to manage a river system with "varying degrees of intensity for its protection and development, based on the special attributes of the area."

Under the Preferred Alternative the South Fork Bridge would be removed and a longer, single-span structure constructed in its place. Bridge removal and replacement would remove piers that act as impediments to flow and avoid future catastrophic collapse of the bridge and the associated localized adverse effects on scenic, recreation, biological, cultural, and scientific Outstandingly Remarkable Values (see table V- 1). Overall, the proposed action would have localized beneficial effects on the scenic, recreation, and biological Outstandingly Remarkable Values. Removal and replacement of the South Fork Bridge could have localized adverse effects on cultural resources, if they are present in a currently undisturbed and unevaluated portion of the riverbank. The effects of the Preferred Alternative on Outstandingly Remarkable Values are summarized below in table V- 1. Generally, the effects of the proposed action would be localized, and limited to the immediate South Fork Bridge project area, thus having no effect on the scenic, recreation, biological, cultural, and scientific processes Outstandingly Remarkable Values on a segment- wide level.

Compatibility with Boundaries

Areas to be managed under the Merced River Plan are defined by boundaries. The act allows for river corridor boundaries that average no more than 320- acres of land per river mile, measured from the ordinary high- water mark on both sides of the river. Boundaries, however, do not limit the protection of Outstandingly Remarkable Values, which must be protected regardless of whether they are inside or outside the corridor boundaries.

In the vicinity of Wawona, including the South Fork Bridge site, the Wild and Scenic River boundary lies 0.25 mile from ordinary high water of the South Fork Merced River, as defined by the U.S. Army Corps of Engineers in 33 CFR Section 328.3. Ordinary high water represents the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area. The South Fork Merced River Bridge Replacement Project is located within the boundaries of Segment 7, Wawona area, which is classified as recreational. The Preferred Alternative is compatible with boundaries, as the project area lies within a recreational river area, which allows access by road and some shoreline development.

Table V-1. Impacts of the Preferred Alternative on Outstandingly Remarkable Values of the South Fork Merced River

Outstandingly Remarkable Value	Effects of the Preferred Alternative
Scenic — This segment provides views from the river and its banks (of Wawona Dome).	The Preferred Alternative would provide a sidewalk on the upstream side of the bridge from which river views would be possible. The views of most interest from the South Fork Bridge would include the river, banks, and riparian vegetation; the historic Covered Bridge; Wawona Dome; forested slopes; the Wawona Golf Course; and the Wawona Store. The Preferred Alternative would protect the scenic Outstandingly Remarkable Value on a localized level by providing a sidewalk that allows viewing opportunities. The Preferred Alternative would have no effect on the scenic Outstandingly Remarkable Value on a segment-wide level.
Recreation — This segment offers opportunities to experience a spectrum of river-related recreational activities, from nature study and photography to hiking.	The Preferred Alternative would provide wider shoulders and a sidewalk on the upstream side of the new bridge, which would allow opportunities to experience a spectrum of river-related recreational activities. These activities include sightseeing, photography, and nature study over the long term. Sidewalk construction would negligibly enhance the recreation Outstandingly Remarkable Value on a localized level, because the effects would be limited to the immediate vicinity of the South Fork Bridge and there would be no effect on the spectrum of river-related recreational activities throughout the remainder of the South Fork Merced River corridor. Although the Preferred Alternative would have localized beneficial effects, on a segment-wide level the Preferred Alternative would have no effect on the recreation Outstandingly Remarkable Value.
Biological — This segment contains a diversity of river-related species, wetlands, and riparian habitats. There are federal and state special-status species in this segment, including Wawona riffle beetle.	The Preferred Alternative would involve regrading and revegetation of the riverbanks in the immediate vicinity of the South Fork Bridge and the temporary bridge structures, which would have site-specific, long-term, beneficial effects on the bank and vegetation integrity. The Preferred Alternative would also improve riparian, wetland, and aquatic habitat for a diversity of river-related species, including special-status species. Under the No Action Alternative the South Fork Bridge would collapse over time and potentially result in damming, flooding, bank erosion, and release of bridge debris downstream, which could temporarily affect riparian and aquatic resources and river-related special-status species. The Preferred Alternative would avoid these impacts to biological resources. The effects of the Preferred Alternative would be limited to the South Fork Bridge area near Wawona, and would have no effects to river-related biological resources throughout the remainder of the South Fork Merced River corridor. The Preferred Alternative would locally enhance this Outstandingly Remarkable Value; however, on a segment-wide level the Preferred Alternative would have no effect on the biological Outstandingly Remarkable Value.
Cultural — This segment contains evidence of thousands of years of human occupation, including numerous prehistoric and historic Indian villages, historic sites, structures, and landscape features related to tourism, early Army and National Park Service administration, and homesteading.	There is a low probability that removal of the South Fork Bridge and replacement with a 16-foot longer structure could have an adverse impact to archeological resources due to ground-disturbing activities. The adverse effects would be limited to the immediate vicinity of the South Fork Bridge, and would have no effect on archeological resources throughout the park. Although the Preferred Alternative would have a localized adverse effect, on a segment-wide level the Preferred Alternative would have no effect on this aspect cultural Outstandingly Remarkable Value. Ethnographic resources, including traditional use areas, would not be affected on a segment-wide basis under the Preferred Alternative.
Scientific — The entire river corridor constitutes a highly significant scientific resource because the river watershed is largely within designated Wilderness in Yosemite National Park. Scientific Outstandingly Remarkable Values relate to the Merced River value for research. This outstandingly Remarkable Value applies to all the Merced River and South Fork segments.	The Preferred Alternative would remove the condemned South Fork Bridge and the temporary Bailey bridge. South Fork Bridge demolition would be conducted in a controlled manner to avoid collapse, would incorporate a containment system to capture debris, and would result in removing two piers from the riverbed. Pier removal would result in a more natural flow regime, establishment of additional habitat to support the Wawona riffle beetle, and restoration of riverbank vegetation following construction. The Preferred Alternative would have a beneficial localized effect to the protection of the scientific Outstandingly Remarkable Value; however, there would be no effect on the scientific Outstandingly Remarkable Value on a segment-wide basis.

Compatibility with Classifications

One of three classifications (Wild, Scenic, or Recreational) was applied to each segment of the river corridor and was based on the existing condition of the river at the time of designation. The classification of a river segment indicates the level of development on the shorelines, the level of development in the watershed, and the degree of accessibility by road or trail.

The Wawona area reach or segment in which the South Fork Bridge is located (Segment 7) has been classified as Recreational due to accessibility and the higher level of development in the Wawona Area. The Preferred Alternative will remove a condemned and flow- impeding bridge and an unsightly temporary bridge from the banks and bed of the South Fork Merced River and replace both with a single- span structure. Replacement of the condemned bridge is compatible with the Recreational classification.

Compatibility with the Wild and Scenic Rivers Act Section 7 Determination Process

The assessment of the Preferred Alternative with regard to compatibility with the Wild and Scenic Rivers Act Section 7 determination process is addressed in Appendix B of this document.

Consistency with the River Protection Overlay

The South Fork Bridge is an essential facility for River Protection Overlay purposes because the bridge is a component of the primary access road into the park from the south, Highway 41. The condemned and closed South Fork Bridge would be removed and replaced with a new single-span bridge under the Preferred Alternative, which would improve free- flowing conditions in this area. Since one of the purposes of the River Protection Overlay is to protect and restore hydrologic processes within the river corridor, the Preferred Alternative would be consistent with the River Protection Overlay. Because the South Fork Bridge is considered an essential facility, a project design has been proposed to minimize impacts to the free- flowing condition of the river and minimize disruption of contribution of woody debris to the river, i.e., the removal of piers within the river channel and bridge. The proposed project incorporates mitigation measures to avoid or reduce impacts. In addition, the temporary Bailey bridge installed to carry traffic in the interim and during construction would be removed. The Preferred Alternative is, therefore, consistent with the River Protection Overlay.

Following removal of the condemned bridge, two piers would no longer impede flow and the abutments would be laid back to stabilize and protect the riverbanks in a more natural manner. Riparian vegetation would be planted to stabilize the bank in the areas up- and downstream of the new bridge abutments and at the temporary bridge site. The National Park Service would monitor this area of the South Fork River to ensure that bank loss does not occur post-construction. Should river processes erode the bank at these sites, the National Park Service would use boulders and other naturally occurring river materials to stabilize the bank.

Consistency with Management Zoning

Management zoning is a technique used by the National Park Service to classify areas and prescribe future desired resource conditions, visitor activities, and facilities. Similar to zoning

common to other types of land- use planning, i.e., municipal zoning, management zoning prescribes future desired conditions for a particular area. A management zone is defined as:

> *A geographical area for which management directions or prescriptions have been developed to determine what can and cannot occur in terms of resource management, visitor use, access, facilities or development, and park operations. Each zone has a unique combination of resource and social conditions, and a consistent management prescription. Different actions will be taken by the National Park Service in different zones with regard to the type and levels of use and facilities (NPS 1997c).*

Management zoning seeks to protect and enhance the Outstandingly Remarkable Values within each segment of the river. Specifically, the Merced River Plan places an emphasis on integrating protection and enhancement of natural and cultural resource Outstandingly Remarkable Values with the protection and enhancement of the diverse recreation Outstandingly Remarkable Values within the river corridor. Management zoning prescribes certain uses and facilities that are not allowed in an area. Before such zoning existed, additional development and higher intensity uses by park visitors could have resulted in impacts to Outstandingly Remarkable Values over the long term. Management zoning also provides opportunities for restoration of Outstandingly Remarkable Values in areas where lower use and facility levels are prescribed. The South Fork Bridge is in management zone 2B, Discovery.

Management zone 2B (Discovery) allows for low to moderate visitor use levels in a somewhat accessible setting where the visitor experience is largely self- directed. The Discovery zone is intended to accommodate vehicle roads and improved trails (can be realigned or relocated where they do not adversely affect Outstandingly Remarkable Values); small turnouts for parking, scenic viewing, or shuttle bus stops; trails for hiking and through- trails for bicycling; minimal restroom facilities; fences, boardwalks, platforms, and other features to direct travel around sensitive resources; interpretive, directional, and safety signs; bridges where necessary for access, improved circulation, safety, and/or resource protection; utilities such as well sites, utility lines, pump stations, and other facilities (where screened from view); and minimal utility crossings of the river, only where necessary to support park operations. Resource protection activities in this zone include restoring natural processes, restoring natural flood cycles and river channel dynamics, and use of fire management practices to enhance biological and hydrologic Outstandingly Remarkable Values. This zone also encourages the protection and enhancement of cultural resource Outstandingly Remarkable Values, including archeological sites, by limiting development and access.

Removal of the condemned, flow- impeding bridge and the unsightly temporary bridge would be consistent with the resource protection activities permissible in the Discovery zone. The proposed bridge demolition activities, including the incorporation of Best Management Practices, would be consistent with the types of activities permissible within management zone 2B. Construction of the new bridge would be compatible with management zone 2B because management zone 2B allows for bridges that improve park access, circulation, and visitor safety in addition to numerous other benefits. The proposed action is consistent with this management element of the Merced River Plan.

Consistency with Visitor Experience and Resource Protection

The VERP framework is a tool developed by the National Park Service to address user capacities and was adopted by the Merced River Plan to meet the requirements of the Wild and Scenic Rivers Act. The VERP framework provides protection for both park resources and visitor

experience from impacts associated with visitor use, and assists managers in addressing visitor use issues. The VERP framework is an ongoing, iterative process of determining desired conditions (including desired cultural resource conditions, desired natural resource conditions, and desired visitor experiences); selecting and monitoring indicators and standards that reflect these desired conditions; and taking management action when the desired conditions are not being realized.

Yosemite National Park began development of the parkwide VERP framework in 1998 and continues to develop desired conditions, indicators, standards, and monitoring protocols. The VERP framework outlined for the *Merced Wild and Scenic River Comprehensive Management Plan* will be implemented during 2005. In the interim, the park will implement existing management activities and direction contained in the Merced River Plan (e.g., Wild and Scenic Rivers Act Section 7 determination, River Protection Overlay, management zoning prescriptions) to address user capacity, protection, and enhancement of Outstandingly Remarkable Values, and management of park resource monitoring to ensure that conditions do not deteriorate. Appropriate management actions, consistent with existing management activities, will be implemented to prevent further degradation of resources. The Preferred Alternative is consistent with VERP, as it is in compliance with the Merced River Plan.

Conclusion

The Preferred Alternative would remove two human- made structures from the bed and banks of the South Fork Merced River, i.e., the South Fork Bridge and a temporary Bailey bridge, and replace them with a single- span bridge structure in the same location. The new bridge would span the entire South Fork Merced River without the need for center support piers, thus restoring a more natural flow through this river reach. Replacement of the South Fork Bridge is necessary because the bridge serves as a primary access road into the park for over one- third of park visitors. Removal of the two existing bridge structures, particularly the two in- stream piers and river- narrowing abutments will restore the South Fork Merced River to more natural free-flowing conditions.

Assessment of the Preferred Alternative with respect to (1) compatibility with boundaries; (2) compatibilities with clarifications; (3) protection and enhancement of Outstandingly Remarkable Values; (4) compatibility with the Wild and Scenic Rivers Act Section 7 determination process; (5) consistency with the River Protection Overlay; (6) consistency with management zoning; and (7) consistency with VERP shows the Preferred Alternative to be compatible or consistent with the evaluation criteria.

Chapter VI: Consultation and Coordination

Introduction

Environmental laws and regulations pertaining to the protection of resources did not exist when the South Fork Bridge was constructed in 1931. An overview of the environmental compliance documents, completed pursuant to National Environmental Protection Act, and which relate to the South Fork Bridge, is presented below in chronological order:

- The *Merced Wild and Scenic River Comprehensive Management Plan* (Merced River Plan) applies seven management elements to prescribe desired future conditions, typical visitor activities and experiences, and park facilities and management activities allowed in the river corridor. The Merced River Plan applies to any project that is within the Wild and Scenic River boundary, which includes the South Fork, or would affect the Outstandingly Remarkable Values or free- flowing condition of the river. Although the Merced River Plan did not specifically call for the removal of the South Fork Bridge, the zoning designations in the plan allow for such an action.

- The original *Environmental Assessment and Finding of No Significant Impact,* South Fork Merced River Bridge Replacement Project*, Yosemite National Park* (1996) was completed prior to passage of the Merced River Plan, and did not consider impacts to the Outstandingly Remarkable Values or the free- flowing condition of the Merced Wild and Scenic River. The Finding of No Significant Impact indicated a temporary bypass bridge would be constructed while the approach to the South Fork Bridge was to be widened, the bridge itself was to be demolished, and a new bridge was to be constructed. Construction was expected to last 13 months with mitigation measures designed to reduce impacts to the lowest possible level. However, several investigations indicated the South Fork Bridge was failing, and in 1997, a major flood on the South Fork Merced River forced the bridge to be condemned and closed. This emergency situation expedited the construction of the temporary bypass bridge, and since 1998, a temporary Bailey bridge has carried traffic on Wawona Road across the South Fork Merced River. In 1999, a lawsuit on the proposed *El Portal Road Improvements Project* resulted in halting plans to remove and replace the South Fork Bridge until completion of an approved, comprehensive management plan for the Merced Wild and Scenic River. A Record of Decision for the *Merced Wild and Scenic River Comprehensive Management Plan* was signed in August 2000 and revised November 2000.

Scoping History

On September 20, 2002, the Yosemite National Park Superintendent mailed a letter announcing the resumption of the planning process for the removal and replacement of the South Fork Bridge. This letter was sent to individuals and organizations on the Yosemite National Park mailing list, and background, timeline, and public involvement information was published on the park Web site. The letter also detailed the time, location, and purpose of a public meeting for the project.

The purpose of the renewed planning process is to identify alternatives for the South Fork Merced River Bridge Replacement Project that are consistent with the Merced River Plan. During the planning process, alternatives have been developed that address bridge removal and

compliance with the Wild and Scenic Rivers Act of 1968, as amended (16 USC 1274[d]). Through scoping and the public comment review process on the South Fork Merced River Bridge Replacement Project, the planning process is being conducted in consultation with affected federal agencies, state and local governments, tribal groups, and interested organizations and individuals.

Public Involvement

Press releases describing the project and soliciting public comment were issued in September 2002. On October 23, 2002, the National Park Service held a public meeting at the Yosemite Valley Visitor Center, East Auditorium, to discuss several planning projects, including the South Fork Merced River Bridge Replacement Project, with interested citizens. The purpose of the meeting was to: (1) provide participants with an overview of existing conditions and the Preferred Alternative, (2) ask participants to identify key issues that should be analyzed during the environmental review and compliance process, and (3) provide an opportunity for participants to ask questions regarding project alternatives and the overall environmental review and compliance process. Comments were received until October 26, 2002. Since that time, the project has been included in the monthly open houses held at the park on February 26, 2003 and March 28, 2003 (Yosemite Valley Visitor Center, East Auditorium) to discuss all upcoming park projects and has been included in the quarterly *Planning Update* newsletters for Yosemite National Park issued in September 2002 and January 2003.

Results of Scoping

As a result of the scoping effort to date, 10 responses were received. All comments received in response to the scoping notices have been duly considered and will remain in the project record throughout this planning process. A summary and full report on the analysis of the public scoping comments are available to the public and can be obtained through the park (USFS–CAT 2002).

Public Comment Period

Media announcements initiate the beginning of a formal public comment period on the *South Fork Bridge Removal and Replacement Environmental Assessment*. All interested agencies, groups, and individuals are invited to review the document and submit comments during the 30- day public comment period. Two National Park Service open houses will take place during the comment period for this document. Project managers and representatives will be on hand to answer questions and accept written comments. Open houses are scheduled for April 23, 2003 and May 21, 2003 from 2:00 P.M. to 6:00 P.M. and will take place at the Yosemite Valley Visitor Center East Auditorium.

Coordination

U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers issued a permit to the National Park Service in 1996 granting the use of a Nationwide Permit for the South Fork Merced River Bridge Replacement Project (USACE 1996). This permit has expired and the National Park Service is coordinating with the U.S. Army Corps of Engineers to ensure that a current permit is in place before project implementation.

Central Valley Regional Water Quality Control Board

The National Park Service is currently coordinating with the Central Valley Regional Water Quality Control Board to obtain required Clean Water Act Section 401 Water Quality Certification. The National Park Service may be required to submit a report of waste discharge, obtain waste discharge requirements, or an individual waiver.

Federal Highway Administration

The Federal Highway Administration examined the South Fork Bridge on three occasions: once in 1992, once in 1993, and once in 1997, after the January 1997 flood. In 1992, the Federal Highway Administration structural inspection of the South Fork Bridge identified deflection in the steel girders, requiring the park to impose weight restrictions on the bridge. As a result, the bridge was determined to be critically deficient, but was allowed to remain in service with an estimated remaining life of 10 years. A scour hole was discovered under one of the bridge piers in 1993, and a related hydraulic field review resulted in a recommendation to completely reconstruct the South Fork Bridge. The January 1997 flood resulted in additional scouring around piers and abutments, and the Federal Highway Administration condemned and closed the South Fork Bridge in 1998, after the installation of a temporary bypass bridge. The Federal Highway Administration determinations on the South Fork Bridge are on file at Yosemite National Park.

U.S. Fish and Wildlife Service

The Endangered Species Act of 1973, as amended (16 USC 1531 *et seq*.), requires all federal agencies to consult with the U.S. Fish and Wildlife Service to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of listed species or critical habitat. On September 26, 2002, the National Park Service requested a list of federally listed and other sensitive species that may be affected by the project. The U.S. Fish and Wildlife Service responded in writing on October 2, 2002, and fulfilling the requirements to provide species lists under section 7(c) of the Endangered Species Act. The National Park Service will continue to coordinate with the agency on the *South Fork Bridge Removal and Replacement Environmental Assessment*.

California State Historic Preservation Office

The South Fork Merced River Bridge and surrounding resources have been the subject of previous evaluation and mitigation actions. The bridge is located within the boundaries of both the Wawona Cultural Landscape and the Wawona Archeological District. However, the bridge is not eligible for listing in the National Register of Historic Places due to damage and reconstructions since its original construction in 1931 that have compromised its architectural and historic integrity. In 1991, the bridge was documented to HAER standards, which included historical and descriptive data, measured drawings, and archival photographs. In accordance with the protocols agreed upon by Yosemite National Park and the California State Historic Preservation Office on March 20, 1997, the current level of documentation for the South Fork Merced River Bridge was determined sufficient.

One archeological site, CA- MRP- 171, lies within the proposed project area. Beginning in 1994, the National Park Service initiated formal consultation with the California State Historic Preservation Office regarding this site, in preparation for the proposed removal of the South Fork Bridge. Consequently, the site has been formally determined eligible for listing in the National Register of Historic Places as a contributing element of the Wawona Archeological District. Based on the

results of test excavations and construction monitoring in 1984, and the subsequent development of an appropriate research approach and scope of work, the California State Historic Preservation Office in 1994 concurred with a data recovery plan to mitigate the adverse effects to the archeological site by the proposed bridge replacement project. Execution of the data recovery plan would result in a determination of *no adverse effect* for the site.

Removal of the South Fork Bridge would comply with the requirements in Appendix H (Historic Preservation Memorandum of Understanding) of the Merced River Plan. This Programmatic Agreement is between the National Park Service at Yosemite, the California State Historic Preservation Office, and the Advisory Council on Historic Preservation regarding planning, design, construction, operations, and maintenance activities at Yosemite National Park. One stipulation of removal of the South Fork Bridge remains—obtaining California State Historic Preservation Office consent to the removal of the bridge. This stipulation to coordinate Section 106 (Section 36 CFR Part 800) consultation with the State Historic Preservation Office and the Advisory Council on Historic Preservation is required under the National Historic Preservation Act of 1966. The National Park Service will request consensus from the agencies upon completion of the environmental assessment.

In a 1994 letter, the California State Historic Preservation Office responded to a request from Yosemite National Park for review of the proposed project in compliance with the 1979 Memorandum of Agreement between the two entities. The letter references a report submitted by the National Park Service, which describes the above- mentioned site as being within the area of potential effect for the South Fork Merced River Bridge Replacement Project. That report apparently describes test excavations and construction monitoring undertaken in 1984 at the site, which identified the presence of two American Indian components and a historic refuse dump. Based on these results, the California State Historic Preservation Office concurred with the research approach and scope of work necessary to perform data recovery at this National Register of Historic Places- eligible site, under the 1979 Memorandum of Agreement (COHP 1994).

Archeological monitoring at the site was undertaken in April 1998, during the installation of the temporary Bailey bridge. In the upper soil stratum, cultural remains were observed that consisted of two obsidian flakes and various historic debris: nondiagnostic bottle glass fragments (amber, clear, and green), cut cow bone fragments, a bullet shell, and unidentified metal fragments. For the north bridge approach, the National Park Service observed obsidian flakes in the upper 10 to 15 cm (4–6 inches) of soil. Also recorded was a historic road culvert and a 1931 brass cap benchmark that were unearthed (the latter collected). No intact prehistoric deposits were encountered during the monitoring (Montague 1998).

A report entitled the *Archeological Survey of Wawona Road, Yosemite National Park, California,* was submitted by Yosemite National Park to the California State Historic Preservation Office for review on January 17, 1996 (NPS 1996c). The report presents cultural resource documentation and limited preliminary evaluation in support of a project to rehabilitate Wawona Road, designated Yosemite Package #565. The letter specifically requests concurrence for the current project (replacement of the South Fork Bridge), which is one proposed project within the package. The letter also mentions that the California State Historic Preservation Office has previously been consulted regarding this project (NPS 1996b).

In a final consultation letter for the proposed project, the California State Historic Preservation Office states their understanding that archeological sites in the undertaking's area of potential effect "were subject to data recovery excavations pursuant to the terms of the National Park Service 1979 Memorandum of Agreement" (COHP 1996). This letter was written in response to the receipt of the 1996 environmental assessment for the proposed project from the Federal Highway Administration. The letter further notes that the environmental assessment suggests that data recovery would be implemented prior to project construction and inquires whether the data

recovery has been conducted and reported (COHP 1996). The data recovery report (NPS 2000c) states that it "constitutes sufficient mitigation and a finding of *no adverse effect* for the proposed undertaking." This is because the data recovery was undertaken within the constructs of the 1979 Memorandum of Agreement. The data recovery document reiterates that an Inadvertent Discovery Plan and archeological monitoring is recommended for the remaining bridge demolition and construction work.

American Indian consultation was conducted to determine if culturally associated American Indian communities had any religious or other significant cultural concerns associated with the project area. Associated American Indian organizations interested in the process include the American Indian Council of Mariposa County, Inc., the North Fork Mono Indian Museum, and the Chukchansi Tribal Government. As a result of these discussions, two American Indian monitors representing the Chukchansi tribal council and the American Indian Council of Mariposa County, Inc., observed the previously discussed excavations and assisted with fieldwork (NPS 2000c).

Native American Consultation

American Indian consultation was conducted to determine if culturally associated American Indian communities had any religious or other significant cultural concerns associated with the project area. Associated Native American organizations interested in the process include the American Indian Council of Mariposa County, Inc., the North Fork Mono Indian Museum, and the Chukchansi Tribal Government. As a result of these discussions, two American Indian monitors representing the Chukchansi Tribal Council of Mariposa County, Inc. observed the previously discussed excavations and assisted with fieldwork (NPS 2000c).

Future Information

Updated information about various aspects of the South Fork Merced River Bridge Replacement Project will be periodically distributed via newsletters, mailings, the Yosemite National Park web site (www.nps.gov/yose/planning), and regional and local news media. Discussion of the project is included in monthly open house meetings held at the park as well as the quarterly *Planning Update* newsletters available through the park or on the park web site. Interested individuals, organizations, and agencies may also respond to:

Superintendent, Yosemite National Park
ATTN: South Fork Merced River Bridge Replacement Project
PO Box 577
Yosemite, CA 95389

or email comments to:	
YOSE_planning@nps.gov	Yosemite National Park planning email address. Use for requesting information, planning documents, or submitting comments on projects; provide name of project in subject line.
or FAX comments to:	
209/379- 1294	Yosemite Planning FAX number; use for requesting information, planning documents, or submitting comments on projects.
or leave a voice mail at:	
209/379- 1365	Yosemite Planning voicemail box; use only for requests to be added to mailing list for the *Yosemite Planning Update* or for copies of planning documents; no comments on projects are accepted.

List of Agencies, Organizations, and Businesses that Received the South Fork Merced River Bridge Replacement Environmental Assessment

Acton – Agua Dulce Trails Council
ADA Compliance Service
Advisory Council on Historic Preservation
AIA California Council
Alameda County Public Library
All Seasons Groveland Inn
American Alpine Club
American Hiking Society
American Indian Council of Mariposa, Inc.
American River Club
American Whitewater
Ansel Adams Gallery
Antelope Valley Press
Associated Press
Automobile Club of Southern California
Backcountry Horsemen of California
Bakersfield Californian
Bassett Memorial Library
Biophilia Society
Bishop Chamber of Commerce
Bureau of Land Management
Bureau of Reclamation
California Department of Boating and Waterways
California Department of Fish and Game
California Department of Parks and Recreation
California Department of Justice, Attorney General
California Department of Transportation (Caltrans)
Caltrans, Transportation Planning Branch
Caltrans Central Regional Environmental Analysis Office
Caltrans District 9
Caltrans District 6
Caltrans Division of Transportation Planning, MS32
Caltrans Environmental Planning
Caltrans New Technology and Research
Caltrans Planning
California Native American Heritage Commission
California Office of Historic Preservation
California Office of Planning and Research
California Regional Water Quality Control Board
California State Clearinghouse
California State Department of Justice
California State Mining and Mineral Museum
California State Resources Agency
California State Senate
California Trade and Commerce Agency
California Trout Inc, Sierra Nevada Office
California Bicycle Coalition
California Preservation Foundation
California State Automobile Association
California State Library
California Wilderness Coalition
Californians for Western Wilderness
Canyonlands National Park
Central Sierra Environmental Resource Center
California Native Plant Society Sequoia Chapter
Coconino National Forest
Coldwell Banker – Dan Blough & Associates
Columbia College Library
Comfort Inn
Congressman George Miller
Conservation Study Institute
Contra Costa Times
Council of Fresno County Governments
California State University Fresno, Henry Madden Library
California State University Sacramento
California State University Stanislaus
Cycle California! Magazine
David Evans & Associates, Inc.
Delaware North Corporation
Department of Defense U.S. Army Corps of Engineers
Earth First! –Santa Cruz
Earth Island Institute
Earthjustice Legal Defense Fund
East Bay Bicycle Coalition
Eastern Madera County Chamber of Commerce
ECO News
Economic Development Council
El Portal Chevron
El Portal Homeowners Association
El Portal Market
El Portal Town Planning Advisory Committee
Environment & Natural Resources
Environment Now
Environmental Defense Fund
Environmental Science Associates
Federal Emergency Management Association
Fish Camp Advisory Council
Fish Camp Property Owners Association
Foothill Resources
Foresta Preservation Association
Fresno Chamber of Commerce
Fresno County Board of Supervisors
Fresno County Planning and Resource Management
Fresno County City Planning Department

Fresno Flats Historical Library, SHSA
Fresno Visitors Bureau
Friends of the Earth
Friends of the River
Friends of the River/American Rivers
Friends of Yosemite Valley
George Radanovich, Representative
Groveland Branch Library
Groveland Community Services District
Groveland Ranger District
Groveland Rotary
HA Lewis, Inc
Heritage Trails
Highway 120 Association
Highways Magazine
Host Communications
Humboldt- Toiyabe National Forest
Inyo County Planning Department
Inyo National Forest
John T. Doolittle, Representative
KCBS- AM Radio
KCRA TV
KFBK Radio
KFIV Radio
KGO Radio
KMJ Radio
KMPH Radio
KOVR TV
KQED Radio
KTVU
KUHL/KZSQ Radio
KVML, KZSQ, & KKBN
KXTV
Los Angeles City Public Library
Los Angeles Times
Madera County
Madera County Board of Supervisors
Madera County Chuckchansi Tribal Government
Madera County North Fork Mono Indian Museum
Mammoth Lakes Chamber of Commerce
Marin County Public Library
Mariposa County
Mariposa County Air Pollution Control District
Mariposa County Board of Supervisors
Mariposa County Chamber of Commerce
Mariposa County Department of Public Works
Mariposa County High School
Mariposa County Planning Department
Mariposa County Public Library
Mariposa County Unified School District
Mariposa County Visitors Bureau
Mariposa Gazette
Mariposa Horse Association
Mariposa Public Utility District
Mariposa Superintendent of Public Schools
Mariposa Tribune
Merced Conference and Visitor Center
Merced County Association of Governments
Merced County Planning Commission
Merced County Planning Department
Merced Irrigation District
Merced Sun Star
MERG
MIG- Berkeley
Minarets Ranger District
Modesto County City Planning Department
Modesto County Planning Department
Mono County Board of Supervisors
Mono County Bridgeport Paiute Indian Colony
Mono County Community Development Department
Mono County Mono Lake Indian Community
Mono County Planning Department
Monograph Acquisition Services
Mountain Light Photography
National Tour Association
National Trust for Historic Preservation
Native Habitats
Natural Resources Council
Natural Resources Defense Council
NBC News
NBC TV
Newsweek
North Fork Rancheria
Northcoast Environmental Center
National Parks and Conservation Association, National Office
National Park Service (NPS)
NPS – Air Resources Division
NPS – Columbia Cascades Seattle Office
NPS – Denver Service Center
NPS – Pacific West Region
NPS – Pacific Great Basin Support Office
NPS – Water Resources Division
NPS – Office of Legislative and Congressional Affairs
Oakhurst Public Library
Oakland Tribune
Office of Assemblyman Dave Cogdill
Official Trip Reports
SBC Pacific Bell
Pacific Gas and Electric Public Affairs
Pacific Legal Foundation
Planning and Conservation League
Pacific Southwest Region Forest and Range Experimental Station
Ramada Limited Oakhurst
Royston, Hanamoto Alley & Abey
Robert Crown Law Library

Royal Robbins, Inc.
Sacramento County Public Library
Salazar Library, Sonoma State University
San Bernardino County Public Library
San Francisco Chronicle
San Francisco City Public Library
San Francisco Examiner
San Francisco Public Utilities Commission, Hetch Hetchy Water & Power
San Joaquin Valley Air Pollution Control District
San Jose City Public Library
San Jose Mercury News
Santa Cruz County Library
Save- the- Redwoods League
Saving Yosemite
Scotty's B&B/Cabin Rentals
Service Employees International Union Local 535
Sequoia Alliance
Sierra Club
Sierra Club Condor Group
Sierra Club Loma Prieta Chapter
Sierra Club Merced Group
Sierra Club National Office
Sierra Club Range of Light, Toiyabe Chapter
Sierra Club Tuolumne Group
Sierra Club Yosemite Committee
Sierra Communications
Sierra National Forest
Sierra Railroad Company
Sierra Star
Sierra Telephone
Sonoma County Library
Sonora Union Democrat
Soroptomist International of Groveland
Saint Patrick- Saint Vincent High School
Stanford University Green Library
Stanislaus County Environmental Review Committee
Stanislaus Council of Government
Stanislaus County Library
Stanislaus National Forest
State Water Resources Control Board
Stockton Record
Teamsters 386
The Access Fund
The Fresno Bee
The Modesto Bee
The Mountain Democrat Newspaper
The Redwoods in Yosemite
The Sacramento Bee
The Trust for Public Land
Theroux Environmental
Tioga Lodge
The Nature Conservancy Weed Program
Tuolumne County
Tuolumne County Board of Supervisors
Tuolumne County Chamber of Commerce
Tuolumne County Community Development
Tuolumne County Department of Public Works
Tuolumne County Planning Commission
Tuolumne County Tuolumne Me- wuk Tribal Council
Tuolumne County Visitor Bureau
University of California Berkeley Bancroft Library
University of California Davis Shields Library
University of California Water Resources Center Archives
University of California Los Angeles Maps and Government Information Library
University of California Los Angeles Young Research Library
United States Attorney's Office
University of California Library Tech Services
University of Minnesota Forestry Library
URS
U.S. Congress
U.S. Department of Justice
U.S. Department of the Interior, Bureau of Land Management
U.S. Environmental Protection Agency, Region IX
U.S. Fish and Wildlife Service
U.S. Geological Survey (USGS)
U.S. Post Office
USA Media
U.S. Department of Agriculture, Natural Resource Conservation Service
U.S. Department of the Interior Library
USGS Publications Department
USGS Water Resources Division, Western Region
Via Adventures
Wawona Area Property Owners Association
Wawona Town Plan Advisory Committee
Wild Earth Advocates
Wild Wilderness
Wilderness Society
Wilderness Watch
Wildlands Center for Preventing Roads
Yosemite Association Board of Trustees
Yosemite Area Audubon
Yosemite Association
Yosemite Bug Hostel
Yosemite Campers Association
Yosemite Campers Coalition
Yosemite Concession Services
Yosemite Fund
Yosemite Guides
Yosemite Institute

Yosemite Mobilization Committee
Yosemite Motels
Yosemite Mountaineering School
Yosemite Partners GMP
Yosemite Pines
Yosemite Research Center
Yosemite Research Library
Yosemite Restoration Trust
Yosemite Sierra Visitors Bureau
Yosemite Sightseeing Tours
Yosemite Valley Railroad Company
Yosemite Valley School
Yosemite West Group
Yosemite West Home Owners
Yosemite West Real Estate

Chapter VII: List of Preparers and Reviewers

Name	Responsibility	Education	Years Experience
National Park Service, Yosemite National Park			
Michael J. Tollefson	Superintendent	B.A. Business Administration (Marketing and Finance)	30 NPS
David A. Mihalic	Former Superintendent	M.S. Park and Recreation Resources B.S. Recreation Administration	25 NPS 6 other
Kevin Cann	Deputy Superintendent	Two years undergraduate studies	24 NPS
Bill Delaney	Chief of Project Management	Registered Professional Engineer B.S. Civil Engineering	23 NPS
Palmer (Chip) Jenkins	Former Chief of Strategic Planning	B.A. Geography and Environmental Studies	15 NPS
Michael Pieper	Project Manager	Civil Engineer	9 NPS
Lisa Acree	Regulatory Compliance	B.A. Environmental Studies	11 NPS 6 other
Mark A. Butler	Environmental Planning and Physical Science	M. Public Administration B.S. Soils and Water Science/ Environmental Toxicology	21 NPS 3 other
Gary Colliver	Comment Analysis Draft Public Comment Report	M.A. Interdisciplinary Studies (Human Ecology/Geography) B.A. Biology	13 NPS 18 other
David Forgang	Cultural Resources	M.A. Anthropology and Special Museum Studies B.A. Anthropology/Zoology	30 NPS
Sue Fritzke	Vegetation	M.S. Physical Geography and Plant Ecology B.A. Environmental Studies and Geography	16 NPS
Russell Galipeau	Chief of Resources Management	B.S. Forest Resource Conservation	19 NPS 3 other
Glen Rothell	Administration	B.S. Renewable Natural Resources	28 NPS
Kristina Rylands	Editor-in-Chief	Graduate work in Education B.A. English/Natural History	4 NPS 15 other
National Park Service, Denver Service Center			
Mark Alexander	Project Manager Contract Coordinator	Civil Engineer	
Larry Walling	Asst. Project Manger, Contract Coordinator	B.S. Landscape Architecture	24 NPS 2 other
Federal Highway Administration			
Anita Gebbie-Deisch	Project Design Engineer	Registered PE B.S. Geological Engineering	14.5 Public
Rick West	Project Manager Project Design Engineer	Registered PE, BSCE	23 Public

Name	Responsibility	Education	Years Experience
Entrix, Inc.			
Brenda Peters	Compliance Specialist	M.A. Public Administration B.A. Environmental Studies and Sociology	22 Private
engineering-environmental Management, Inc.			
Jayne Aaron	NEPA Project Manager Cultural Resources Director	M.A. Environmental Policy and Management	18 Private
Jim Von Loh	EA Project Manager Biologist	M.S. Biology B.S. Biology	19 Private 8 Public
Dan Niosi	Air Quality, Noise, Park Operations, Facilities, Visitor Experience	B.A. Environmental Studies, Natural Resources	3 Private
Craig Vrabel	Geology, Geologic Hazards, and Soils; Hydrology,and Water Quality	B.S. Geology	14 Private
Anne Baldrige	Project Manager Environmental Conservation and Planning	B.S. Geology M.B.A. Finance and Accounting	18 Private 4 Public
Lori Rhodes	Cultural Resources Analysis, Historic Resources Analysis	M.A. Anthropology B.A. Anthropology	11 Private 8 Public
Wanda Gray Lafferty	Technical Publications Specialist	Two years undergraduate study	25 Private

Chapter VIII: Glossary and Acronyms

Abutment: A structure that supports the end of a bridge.

Affected environment: Existing biological, physical, and social conditions of an area that are subject to change, both directly and indirectly, as a result of a proposed human action.

Alluvial: An adjective referring to alluvium, which are sediments deposited by erosional processes, usually by streams.

Alluvium: A general term for clay, silt, sand, gravel, or similar unconsolidated rock fragments or particles deposited during comparatively recent geologic time by a stream or other body of running water.

Alternatives: Sets of management elements that represent a range of options for how, or whether to proceed, with a proposed project. An environmental assessment analyzes the potential environmental and social impacts of the range of alternatives presented.

Backfill: Material used to replace or the act of replacing material removed during construction. Material placed or the act of placing material adjacent to structures.

Backhoe: An excavator whose bucket is rigidly attached to a hinged pole on the boom and is drawn backward to the machine when in operation.

Base: The layer or layers of material placed on a subbase or subgrade to support a surface course such as asphalt.

Bed and bank: The area below the ordinary high- water mark in a river or stream. The ordinary high- water mark is defined by the U.S. Army Corps of Engineers as the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area.

Basin: Refers to a drainage basin. A region or area bounded by a drainage divide and occupied by a drainage system. Specifically, an area that gathers water originating as precipitation and contributes it to a particular stream channel or system of channels. Synonym: watershed.

Batholith: Refers to a very large body of plutonic rock. The Sierra Nevada batholith comprises several smaller plutons that represent the repeated intrusions of granitic magma. From the Greek *bathos* (deep) and *lithos* (rock).

Bed: Refers to the relatively flat or level bottom (substrate) of a body of water, as in a lakebed or riverbed.

Benign neglect: A hypothetical management action of the No Action Alternative. A policy of taking no action instead of managing or improving the situation.

Bedload: Material (e.g., sand, gravel, and cobbles) carried by a river. It is typically suspended in the water column with high enough flow velocities, and then deposited when flow velocities slow.

Best Management Practices: Effective, feasible (considering technological, economic, and institutional constraints) conservation practices and land- and water- management measures that

avoid or minimize adverse impacts to natural and cultural resources. Best Management Practices may include schedules for activities, prohibitions, maintenance guidelines, and other management practices.

Boundaries: The areas that receive protection under the Wild and Scenic Rivers Act. Boundaries include an average of not more than 320 acres of land per mile, measured from the ordinary high-water mark on both sides of the river.

Bridge: A structure more than 20- feet long, including supports, spanning and providing passage over a depression, waterway, railroad, highway or other obstruction.

CEQ Regulations: The Council on Environmental Quality was established by the National Environmental Policy Act (see National Environmental Protection Act) and given the responsibility for developing federal environmental policy and overseeing the implementation of the National Environmental Protection Act by federal agencies.

Classifications: The status of rivers or river segments under the Wild and Scenic Rivers Act (Wild, Scenic, or Recreational). Classification is based on the existing level of access and human alteration of the site.

Cofferdams: Temporary enclosures that are pumped dry to expose the riverbed so that construction can proceed.

Comprehensive management plan: A programmatic plan to protect and enhance a Wild and Scenic River. The Merced River Plan is the National Park Service's comprehensive management plan for segments of the Merced River corridor under its jurisdiction within Yosemite National Park.

Construction limits: The limits on each side of the project, which establish the area disturbed by construction operations and beyond which no disturbance is permitted. Typically the construction limits are the same as the clearing limits.

Cultural landscape: A reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials, such as roads, buildings, walls, and vegetation, and by use reflecting cultural values and traditions.

Culvert: Any structure not classified as a bridge that provides an opening under the roadway.

Cut line: The line along which the abutment would be separated from the bridge.

Ecosystem: An ecosystem can be defined as a geographically identifiable area that encompasses unique physical and biological characteristics. It is the sum of the plant community, animal community, and environment in a particular region or habitat.

Environmental Assessment: A public document required under the National Environmental Policy Act that identifies and analyzes activities that might affect the human and natural environment. An environmental assessment is a concise public document that provides sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement, aids an agency's compliance with National Environmental Policy Act when no Environmental Impact Statement is necessary, and facilitates preparation of an Environmental Impact Statement when one is necessary.

Environmental Impact Statement: A public document required under the National Environmental Policy Act that identifies and analyzes activities that might affect the human and natural environment.

Excavator: A piece of heavy equipment that is used to dig or scoop material with a bucket attached to a hinged pole and a boom.

Facilities: Buildings and the associated supporting infrastructure such as roads, trails, and utilities.

False work: Any temporary construction work used to support the permanent structure until it becomes self- supporting. False work includes steel or timber beams, girders, columns, piles, foundations, and any proprietary equipment including modular shoring frames, post shores, and adjustable horizontal shoring.

Finding of No Significant Impact: The public document describing the decision made on selecting the preferred alternative in an environmental assessment (see environmental assessment).

Floodplain: A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial: Of or pertaining to a river. Fluvial is a technical term used to indicate the presence or interaction of a river or stream within the landform.

Forms: Temporary structures or molds used to retain plastic or fluid concrete in its designated shape until it hardens. Forms are required to have sufficient strength to resist the fluid pressure exerted by plastic concrete and all additional fluid pressure effects generated by vibration.

Free- flowing condition: Existing or flowing in natural condition without impoundment, diversion, straightening, riprapping, or other modification of the waterway (as defined in the Wild and Scenic Rivers Act – 16 USC 1286 [b]).

Glaciation: Effects on landforms produced by the presence and movement of a glacier.

Geomorphic: Of or pertaining to the form of the earth or of its surface features.

Geomorphology: Geologic study of the configuration and evolution of landforms.

Grader: A piece of heavy equipment used to level or smooth road or other surfaces to the desired gradient.

Granitic rocks: Igneous rocks (intrusive magma) that have cooled slowly below the earth's surface, typically consisting of quartz, feldspar, and mica. In contrast to granitic rocks, if magma erupts at the earth's surface, it is referred to as lava. Lava, when cooled, forms volcanic rocks.

Groundwater: All subsurface water (below soil/ground surface), distinct from surface water.

Groundwater recharge: The process involved in the absorption and addition of surface water to the zone of saturation or aquifer.

Hazardous material: A substance or combination of substances that, because of quantity, concentration, or physical, chemical, or infectious characteristics, may either: (1) cause or significantly contribute to an increase in mortality or an increase in serious, irreversible, or

incapacitating illness; or (2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Hazardous waste: Hazardous wastes are hazardous materials that no longer have practical use, such as substances that have been discarded, spilled, or contaminated, or that are being stored temporarily prior to proper disposal.

Headwaters: The point or area of origin for a river or stream.

Hydrophytes: Any plant growing in water or in a substrate that is at least periodically deficient in oxygen as a result of excessive water. Plants typically found in wetland habitats.

Impoundment: A dam or other structure to obstruct the flow of water in a river or stream.

Jack: A usually portable device for raising heavy objects by means of force applied with a lever, screw, or hydraulic press. Also a wooden or metal wedge for cleaving rock.

Main stem (Merced River): The sections of the Merced River beginning at the headwaters near the Sierra Crest and continuing through Yosemite Valley, the Merced River gorge, El Portal, and further downstream.

Management zone: A geographical area for which management directions or prescriptions have been developed to determine what can and cannot occur in terms of resource management, visitor use, access, facilities or development, and park operations. One of seven management elements prescribed in the *Merced Wild and Scenic River Comprehensive Management Plan*.

Mitigation: Activities that will avoid, reduce the severity of, or eliminate an adverse environmental impact.

National Environmental Policy Act: The federal act that requires the development of an environmental assessment or environmental impact statement for federal actions that have environmental, social, or other impacts.

Natural processes: All processes (such as hydrologic, geologic, or ecosystemic) that are not the result of human manipulation.

No Action Alternative: The alternative in a plan that proposes to continue current management direction. "No action" means the proposed activity would not take place, and the resulting environmental effects from taking no action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward.

Non- native species: Species of plants or wildlife that are not native to a particular area and often interfere with natural biological systems.

Nonpoint pollution sources: Pollutants that enter the environment from locations that generally are not contained. Examples of nonpoint sources are roadways, parking lots, and landscaped areas. Pollutants from these locations can include petrochemicals, heavy metals, and fertilizers.

Ordinary high water: The line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area.

Outstandingly Remarkable Values: Those resources in the corridor of a Wild and Scenic River that are of special value and warrant protection. Outstandingly Remarkable Values are the

"scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values… that shall be protected for the benefit and enjoyment of present and future generations" (16 USC 1272).

Palustrine: The palustrine system was developed to group the vegetated wetlands traditionally called by such names as marsh, swamp, bog, fen, and prairie, which are found throughout the United States. It also includes the small, shallow, permanent, or intermittent water bodies often called ponds. Palustrine wetlands may be situated shoreward of lakes, river channels, or estuaries; on river floodplains; in isolated catchments; or on slopes. They may also occur as islands in lakes or rivers. The palustrine system includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean- derived salts is below 0.5%. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 8 hectares (20 acres); (2) active wave- formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 2 meters at low water; and (4) salinity due to ocean- derived salts less than 0.5%.

Particulate matter (PM- 10 and PM- 2.5): Fractions of particulate matter characterized by particles with diameters of 10 microns or less (PM- 10) or 2.5 microns or less (PM- 2.5). Such particles can be inhaled into the air passages and the lungs and can cause adverse health effects. High levels of PM- 2.5 are also associated with regional haze and visibility impairment.

Pavement structure: The combination of subbase, base, and surface courses placed on a subgrade to support and distribute the traffic load to the roadbed.

Pluton: A general term applied to any body of intrusive igneous rock that originates deep in the earth. Named for Pluto, Greek god of the underworld.

Prescription: A guideline that directs the management of a specific area by describing the type and intensity of activities, facilities, and park operations that can and cannot occur (see management zone).

Riparian areas: The land area and associated vegetation bordering a stream or river.

Riverine: Of or relating to a river. A riverine system includes all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens; and (2) habitats with water containing ocean-derived salts in excess of 0.5%. A channel is an open conduit either naturally or artificially created, which periodically or continuously contains moving water or forms a connecting link between two bodies of standing water.

River corridor: The area within the boundaries of a Wild and Scenic River (e.g., the Merced and South Fork of the Merced River corridor).

River- left: Directional reference for viewing rivers, with the orientation of one standing in the middle of the river looking downstream. River- left is the left- hand side of the river when one is looking downstream.

River- right: Directional reference for viewing rivers, with the orientation of one standing in the middle of the river looking downstream. River- right is the right- hand side of the river when one is looking downstream.

River protection overlay: A buffer area within and adjacent to the river that allows for the protection and restoration of natural and aquatic ecosystem processes. In Yosemite Valley, it includes the river channel itself and extends 150 feet from the ordinary high water mark. One of seven management elements prescribed in the *Merced Wild and Scenic River Comprehensive Management Plan*.

Roadbed: The graded portion of a highway prepared as a foundation for the pavement structure and shoulders.

Section 35: An area of private housing, schools, and facilities occupying an inholding within Yosemite National Park boundaries.

Sediment: A particle of soil or rock that was dislodged, entrained, and deposited by surface runoff or a stream. The particle can range in size from microscopic to cobblestones.

Shoring: This term is used interchangeably with false work.

Shoulder: The portion of the roadway contiguous to the traveled way for accommodation of stopped vehicles, for emergency use, and for lateral support of the pavement structure.

Skid steer loader: A piece of machinery used to lift and transport heavy material with a bucket attachment. The term "skid steer" refers to the loader's unique steering system, which allows it to turn 360- degrees within its own length.

Specifications: The written requirements for performing work.

Structures: Bridges, culverts, catch basins, drop inlets, retaining walls, cribbing, manholes, endwalls, buildings, sewers, service pipes, underdrains, foundation drains, and other features that may be encountered in the work.

Talus: Rock fragments of any size or shape derived from and lying at the base of a cliff or very steep rocky slope. Also refers to outward sloping and accumulated heap of loose, broken rock considered as a unit and formed primarily by falling, rolling, or sliding.

Threatened and endangered species: Species of plants that receive special protection under state and/or federal laws. Also referred to as "listed species" or "special- status species."

U- shaped valley: A glacially carved valley having a pronounced parabolic cross- sectional profile suggesting the form of a broad letter "U" and characterized by steep sides and a nearly flat bottom.

Visitor Experience and Resource Protection (VERP) Framework: A process developed for the National Park Service to help manage the impacts of visitor use on visitor experiences and resource conditions in national parks. One of seven management elements prescribed in the *Merced Wild and Scenic River Comprehensive Management Plan*.

Water resources project: Any dam, water conduit, reservoir, powerhouse, transmission line, or other works project under the Federal Power Act, or other developments that would affect the free- flowing characteristics of a wild and scenic or congressionally authorized study river. In addition to projects licensed by the Federal Energy Regulatory Commission, water resources projects may also include: dams, water diversions, fisheries habitat and watershed restoration, bridges and other roadway construction/reconstruction projects, bank stabilization projects, channelization projects, levee construction, boat ramps, fishing piers, and activities that require a Section 404 permit from the U.S. Army Corps of Engineers (IWSRCC 1999).

Watershed: The region drained by, or contributing water to, a stream, lake, or other body of water. Synonym: basin or drainage basin.

Wetland: Wetlands are defined by the U.S. Army Corps of Engineers (Code of Federal Regulations, Section 328.3[b], 1986) as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Wild and Scenic Rivers: Those rivers receiving special protection under the Wild and Scenic Rivers Act.

Wilderness: Those areas protected by the provisions of the 1964 Wilderness Act. These areas are characterized by a lack of human interference in natural processes.

Wingwall: Structural support component of a bridge, typically concrete, that extends from the back face of the bridge abutment to the riverbank.

Acronyms

CFR	Code of Federal Regulations
cfs	Cubic feet per second
cm	Centimeter
dB	Decibels
dBA	Decibels on the "A"- weighted scale
HAER	Historic American Engineering Record
NO_X	Nitrogen oxide
NPS	National Park Service
PL	Public Law
PM- 10	Particulate matter less than 10 microns
PM- 2.5	Particulate matter less than 2.5 microns
USC	United States Code
VERP	Visitor Experience and Resource Protection
YARTS	Yosemite Area Regional Transportation System

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Appendix A: Regulations and Policies

This appendix describes the key regulations and policies that form the legal context for development of the *South Fork Merced River Bridge Replacement Environmental Assessment*.

National Park Service Enabling Legislation

Act of June 30, 1864, 13 Stat. 325, 16 USC Section 48. Authorizes a grant to California for the "Yosemite Valley," and for land embracing the "Mariposa Big Tree Grove." This tract was "to be held for public use, resort, and recreation" by the state of California, and to "be inalienable for all time."

Act of August 25, 1916 (National Park Service Organic Act), PL 64- 235, 16 USC Section 1, *et seq*. As amended. On August 15, 1916, Congress created the National Park Service with the National Park Service Organic Act. This act, as reaffirmed and amended in 1970 and 1978, establishes a broad framework of policy for the administration of national parks:

> *"The Service thus established shall promote and regulate the use of the Federal areas known as National Parks, Monuments, and Reservations… by such means and measures as to conform to the fundamental purpose of the said Parks, Monuments, and Reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."*

General Legislation and Regulations

Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA) (40 CFR Parts 1500–1508). The Council on Environmental Quality regulations for implementing NEPA establish the process by which federal agencies fulfill their obligations under the NEPA process. The Council on Environmental Quality regulations ascertain the requirements for environmental assessments and environmental impact statements that document the NEPA process. The Council on Environmental Quality regulations also define such key terms as *cumulative impact*, *mitigation*, and *significantly* to ensure consistent application of these terms in environmental documents. This South Fork Merced River Bridge Replacement Project was prepared as directed in the Council on Environmental Quality regulations.

Fish and Wildlife Coordination Act. The objective of the Fish and Wildlife Coordination Act is to provide that wildlife conservation receive equal consideration and be coordinated with other features or water resources development programs. Sections 1 and 2 of the act mandate that fish and wildlife receive equal consideration with water resources development programs throughout planning, development, operation, and maintenance. Whenever a federal agency proposes to impound, divert, channelize, or otherwise alter or modify any stream, river, or other body of water for any purpose, the agency must first consult and coordinate its actions and projects with the U.S. Fish and Wildlife Service. This consultation and coordination process addresses ways to conserve wildlife resources by preventing loss of and damage to such resources as well as to further develop and improve these resources.

National Environmental Policy Act (NEPA) of 1970. PL 991- 190, 83 Stat. 852, 42 USC Section 4341 *et seq*. The NEPA process is intended to help public officials make decisions that are based on an understanding of environmental consequences, and take actions that protect, restore, and

enhance the environment. Regulations implementing NEPA are set forth by the Council on Environmental Quality. The NEPA process guides the overall planning process for the *South Fork Merced River Bridge Replacement Environmental Assessment.*

Wild and Scenic Rivers Act of 1968, as amended (PL 90- 542; 16 USC 12371- 1287). This act established the National Wild and Scenic Rivers System and designated the first Wild and Scenic Rivers. The act requires a comprehensive management plan for designated rivers and contains guidance for their management, particularly with regard to free- flowing condition and Outstandingly Remarkable Values. Section 3(a)(62) contains the language of the 1987 act that added the Merced River to the National Wild and Scenic Rivers System. All actions proposed by this project will protect and enhance the values that are recognized by the Merced Wild and Scenic River designation.

Wild and Scenic Rivers Guidelines, 1982. These guidelines were developed jointly by the U.S. Department of Agriculture and U.S. Department of Interior; the two departments who manage designated rivers through their bureaus. The guidelines are intended to foster consistent interpretation and application of the Wild and Scenic Rivers Act.

Natural Resources Legislation

Bald Eagle Protection Act. No person within the United States or any place subject to the jurisdiction thereof, shall possess, sell, purchase, barter, offer to sell, transport, export, or import at any time or in any manner any bald eagle or any golden eagle, alive or dead, or any part, nest, or egg thereof. The Secretary of the Interior can permit the taking, possession, and transportation of specimens thereof for scientific or exhibition purposes or for the religious purposes of American Indian tribes if the action is determined to be compatible with the preservation of the bald eagle or golden eagle.

Clean Air Act, as amended, PL Chapter III60, 69 Stat. 322,42 USC Section 7401 *et seq*. Section 118 of the Clean Air Act requires all federal facilities to comply with existing federal, state, and local air pollution control laws and regulations. The National Park Service works in conjunction with the Mariposa County Air Pollution Control District to ensure that all construction and demolition activities meet these requirements.

Federal Water Pollution Control Act (commonly referred to as the Clean Water Act) of 1977 (33 USC 1251 *et seq*.). The Clean Water Act provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation's waters. Section 404 of the act prohibits the discharge of fill material into navigable water of the United States, including wetlands, except as permitted under separate regulations by the U.S. Army Corps of Engineers and U.S. Environmental Protection Agency. The placement of fill in wetlands should be avoided if there are practicable alternatives.

California Endangered Species Act. The California Endangered Species Act expanded upon the original plant protection act and enhanced legal protection for plants and wildlife. The California Endangered Species Act parallels the policies of the Federal Endangered Species Act. The state legislation was written to protect state endangered and threatened plant and animal species whose continued existence in California is in jeopardy. The California Endangered Species Act and Sections 2050 and 2097 of the Fish and Game Code prohibit "take" of plant and animal species designated by the California Fish and Game Commission as either endangered or threatened.

California Fish and Game Code. Sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) of the California Fish and Game Code designate certain species as "fully protected." Fully protected species, or parts thereof, may not be taken or possessed at any time without permission by the California Department of Fish and Game. Section 3503 of the

California Fish and Game Code affords protection to bird nests and birds of prey (orders Falconiformes or Strigiformes).

California Native Plant Protection Act. State listing of plant species began in 1977 with the passage of the Native Plant Protection Act. The act directed the California Department of Fish and Game to carry out the legislature's intent to "preserve, protect, and enhance endangered plants in this state." The act gave the California Fish and Game Commission the power to designate native plants as endangered or rare, and to require permits for collecting, transporting, or selling such plants. When the California Endangered Species Act was passed, it expanded upon the Native Plant Protection Act and enhanced legal protection for plants. To align with federal regulations, the California Endangered Species Act adopted the categories "threatened" and "endangered" species. It grandfathered all "rare" animals into the act as threatened species, but did not do so for rare plants. Thus, there are three listing categories for plants in California: rare, threatened, and endangered.

Clean Water Act Amendments of 1987. The 1987 amendments to the act required that the Environmental Protection Agency establish regulations for the issuance of municipal and industrial stormwater discharge permits as part of the National Pollutant Discharge Elimination System. The final Environmental Protection Agency regulations were published in November 1990. These regulations apply to any construction activities that disturb more than five acres of land.

Endangered Species Act of 1973, as amended, PL 93- 205, 87 Stat. 884, 16 USC Section 1531 *et seq*. The Endangered Species Act protects threatened and endangered species, as listed by the U.S. Fish and Wildlife Service, from unauthorized take, and directs federal agencies to ensure that their actions do not jeopardize the continued existence of such species. Section 7 of the act defines federal agency responsibilities for consultation with the U.S. Fish and Wildlife Service and requires preparation of a biological assessment to identify any threatened or endangered species that is likely to be affected by the Preferred Alternative. The National Park Service initiated and maintained formal consultation with the U.S. Fish and Wildlife Service throughout the compliance process of *South Fork Merced River Bridge Replacement Environmental Assessment* in order to meet obligations under the Endangered Species Act.

Migratory Bird Treaty Act. The Migratory Bird Treaty Act regulates or prohibits taking, killing, possession of, or harm to migratory bird species listed in Title 50 CFR Section 10.13. This act is an international treaty for the conservation and management of bird species that may migrate through more than one country and is enforced in the United States by the U.S. Fish and Wildlife Service. Hunting of specific migratory game birds is permitted under the regulations listed in Title 50 CFR 20. The act was amended in 1972 to include protection for migratory birds of prey (raptors).

Porter- Cologne Water Quality Control Act (California Water Code, Section 13020). Under the authority of the Porter- Cologne Act and federal Clean Water Act, Regional Water Quality Control Boards act as regional agencies for the State Water Resources Control Board and are responsible for regional enforcement of water quality laws and coordination of water quality control activities. The regional board for the Yosemite area is the Central Valley.

Resource Conservation and Recovery Act, as amended (RCRA), PL 94- 580, 30 Stat. 1148, 42 USC Section 6901 *et seq*. This act establishes a regulatory structure for the management of solid and hazardous waste from the point of generation to disposal. In particular, applicable provisions include those that address underground storage tanks and sites contaminated with elements identified under Federal and State Resource Conservation and Recovery Act regulations.

Cultural Resources Legislation

Antiquities Act of 1906, PL 59- 209, 34 Stat. 225, 16 USC Section 432 and 43 CFR 3. This act provides for the protection of historic or prehistoric remains, "or any antiquity," on federal lands. It protects historic monuments and ruins on public lands. It was superceded by the Archeological Resources Protection Act (1979) as an alternative federal tool for prosecution of antiquities violations in the National Park System.

Archeological Resources Protection Act of 1979, OK 96- 95, 93 Stat. 712, 16 USC Section 470aa *et seq*. and 43 CFR 7, subparts A and B, 36 CFR. This act secures the protection of archeological resources on public or American Indian lands and fosters increased cooperation and exchange of information between private, government, and the professional community in order to facilitate the enforcement and education of present and future generations. It regulates excavation and collection on public and American Indian lands. It requires notification of American Indian tribes who may consider a site of religious or cultural importance prior to issuing a permit. The act was amended in 1988 to require the development of plans for surveying public lands for archeological resources and systems for reporting incidents of suspected violations.

National Historic Preservation Act of 1966, as amended, PL 89- 665, 80 Stat. 915, 16 USC Section 470 *et seq*. and 36 CFR 18, 60, 61, 63, 68, 79, 800. The National Historic Preservation Act requires agencies to take into account the effects of their actions on properties listed in or eligible for listing in the National Register of Historic Places. The Advisory Council on Historic Preservation has developed implementing regulations (36 CFR 800), which allow agencies to develop agreements for consideration of these historic properties. In 1999, Yosemite National Park, in consultation with the Advisory Council, the California State Historic Preservation Officer, American Indian tribes and the public, developed a Programmatic Agreement for planning, design, construction, operations and maintenance activities. This 1999 Programmatic Agreement provides a process for compliance with National Historic Preservation Act, and includes stipulations for identification, evaluation, treatment, and mitigation of adverse effects for actions affecting historic properties. The National Park Service will follow stipulations of this Programmatic Agreement for all future planning and design projects. The Programmatic Agreement allows the National Park Service to implement standard mitigating measures for some actions, if the State Historic Preservation Office and the public are notified and provided an opportunity to comment.

Native American Graves Protection and Repatriation Act, PL 101- 601, 104 Stat. 3049, 25 USC Sections 3001- 3013. This act assigns ownership or control of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony that are excavated or discovered on federal lands or tribal lands to lineal descendants or culturally affiliated Native American groups.

Executive Orders

Executive Order 11593: Protection and Enhancement of the Cultural Environment. This Executive Order instructs all federal agencies to support the preservation of cultural properties. It directs them to identify and nominate cultural properties under their jurisdiction to the National Register of Historic Places and to "exercise caution… to assure that any federally owned property that might qualify for nomination is not inadvertently transferred, sold, demolished, or substantially altered."

Executive Order 11988: Floodplain Management. This Executive Order requires federal agencies to avoid, to the extent possible, adverse impacts associated with the occupancy and modification of floodplains, and to avoid development in floodplains whenever there is a

practical alternative. If a Preferred Alternative is found to be in the applicable regulatory floodplain, the agency shall prepare a floodplain assessment, known as a Statement of Findings.

Executive Order 11990: Protection of Wetlands. This Executive Order established the protection of wetlands and riparian systems as the official policy of the federal government. It requires all federal agencies to consider wetland protection as an important part of their policies and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands.

Executive Order 13112: Invasive Species. This Executive Order prevents the introduction of invasive species and directs federal agencies to not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species. Actions proposed in the *South Fork Merced River Bridge Replacement Environmental Assessment* include measures to prevent the introduction and spread of invasive species.

Department of Interior – Director's Orders

Director's Orders provide guidance for implementing certain aspects of National Park Service policy. Copies of those that have been completed may be obtained by contacting the National Park Service Office of Policy or by accessing the National Park Service Web site. The following Director's Orders may be relevant to the *South Fork Merced River Bridge Replacement Environmental Assessment* planning process.

Director's Order – 1: The Directives System. The purpose of this Director's Order is to further refine the National Park Service Directives System, first established by Director's Order – 1 on September 1, 1996. The Directives System is a three- level set of documents that give National Park Service managers and staff comprehensive guidance on service- wide policy and required and/or recommended practices and procedures. The Directives System is the means by which the Director delegates line and functional authorities and assigns responsibilities. It reflects our organizational values of teamwork, delegation to the most effective level, empowerment of employees, accountability, and reduction in overall paperwork.

Director's Order – 2: Park Planning. This Director's Order revises and replaces the policies and guidance included in Chapter 2 of the National Park Service Management Policies (1988) and the National Park Service- 2 Planning Process Guideline (1982) as they relate to park planning. This Director's Order documents the decision- making processes that result in the goals and actions specific to each unit of the National Park System and those units of the National Trails System administered by the National Park Service. Park planning is a vital intermediary step that links service- wide planning and decision making to park operations.

Director's Order – 12: Conservation Planning, Environmental Impact Analysis and Decision- making. Director's Order – 12 provides the National Park Service's agency guidance on implementing the National Environmental Policy Act (NEPA). The Department of the Interior produced its NEPA regulations as Part 516 of its departmental manual, and the National Park Service produced several NEPA handbooks. The last update, National Park Service- 12 was issued in 1982. Director's Order - 12 is an update and revision of National Park Service- 12, and it supercedes the 1982 version. Although it is termed a handbook, most of the sections derive in whole or in part from the Council on Environmental Quality regulation or Department of Interior NEPA guidelines, giving them the force of law. Under the terms of the National Parks Omnibus Management Act of 1998, the "Secretary shall take such measures as are necessary to assure the full and proper utilization of the results of scientific study for park management decisions. In each case in which an action undertaken by the National Park Service may cause a significant adverse effect on a park resource, the administrative record shall reflect the manner in which unit resource studies have been considered." The development of alternative, analysis of impacts, and incorporation of the best available information, coupled with identification of environmentally

preferable courses of action as called for in Director's Order – 12, are among the steps required in meeting this obligation to the public. The *South Fork Merced River Bridge Replacement Environmental Assessment* was developed consistent with Director's Order – 12.

Director's Order – 28: Cultural Resource Management. The National Park Service, as steward of many of America's most important cultural resources, is charged to preserve them for the enjoyment of present and future generations. Management decisions and activities throughout the National Park System must reflect awareness of the irreplaceable nature of these resources. The National Park Service will protect and manage cultural resources in its custody through effective research, planning, and stewardship and in accordance with the policies and principles contained in the National Park Service Management Policies. The National Park Service will comply with the substantive and procedural requirements described in the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation. Additionally, the National Park Service will comply with the 1995 Servicewide Programmatic Agreement with the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers.

Director's Order – 50B: Occupational Safety and Health. The National Park Service has a continuing concern about the health and safety of its employees and others who spend time in the parks—whether as visitors, volunteers, contractors, concession employees, or in any other capacity. Those who participate in work or recreational activities in the parks are always, to some extent, exposed to the risk of accident, injury, or illness. In recognizing this, the National Park Service is committed to reducing these risks and the associated pain, suffering, and financial expense. The overall purposes of the National Park Service risk management program are to establish and implement a continuously improving and measurable risk management process that: (1) provides for the occupational safety and health of National Park Service employees; (2) provides for the safety and health of the visiting public; and (3) maximizes the utilization of National Park Service human and physical resources, and minimizes monetary losses through effective workers' compensation case management.

Director's Order – 77- 1: Wetland Protection. The wetland protection provisions of the 1980 National Park Service Floodplain Management and Wetland Protection Guidelines (45 Fed. Reg. 35916, minor revisions in 47 Fed. Reg. 36718), and any other conflicting instructions or delegations of authority, are superseded and replaced by this Director's Order and by Procedural Manual #71- 1. Approved in 1998, the manual was developed for use by the National Park Service in carrying out its responsibilities under Executive Order 11990. The general policies, requirements, and standards included in the manual are:

- No net loss of wetlands and a long- term goal of net wetland gain
- Parkwide wetlands inventories
- Restoration and enhancement of degraded wetland habitats
- Planning and siting to avoid or minimize effects to wetlands
- Restoration of degraded wetlands as compensation for adverse effects to wetlands
- Compliance with federal environmental regulations

Yosemite National Park Plans

Merced Wild and Scenic River Comprehensive Management Plan

The *Merced Wild and Scenic River Comprehensive Management Plan* provides a framework for decision making on future management actions within the Merced River corridor. This will be accomplished through the application of a consistent set of decision- making criteria and considerations composed of seven management elements: boundaries, classifications, Outstandingly Remarkable Value, the Section 7 determination process, management zoning, the River Protection Overlay, and the Visitor Experience and Resource Protection framework.

Resources Management Plan for Yosemite National Park

Approved in 1993, the Resources Management Plan addresses specific natural and cultural resources issues. Natural resource issues addressed include the role of fire in the ecosystem, non-native- plant control, forest pest control, horse and mule grazing, protection of special- status species, human/bear conflicts, other wildlife and fisheries management programs, and the park's research program. The *Resources Management Plan* also addresses management of cultural resources, including archeological and ethnographic resources, as well as cultural landscapes, museum collections, and historic structures.

Yosemite Fire Management Plan

Fire is a natural process of the Sierra Nevada and Yosemite National Park. The recurrence of fire shapes the ecosystems of the park, with many common plants exhibiting specific fire- adapted traits. The National Park Service adopted a *Fire Management Plan* in 1990 that provides clear guidelines regarding when and where to allow wildland and prescribed fires to burn. The National Park Service is in the process of updating its Fire Management Plan. The goal of natural and prescribed fire management in Yosemite is to restore or maintain natural fire regimes to the maximum extent possible so that natural ecosystems can operate essentially unimpaired by human interference. [1]

Yosemite General Management Plan

The 1980 *General Management Plan* restates the park mission in the following management objectives:

- Conduct continuing research to gather and analyze information necessary for managing natural resources
- Restore altered ecosystems as nearly as possible to conditions that would exist had natural ecological processes not been disturbed
- Protect threatened and endangered plant and animal species and reintroduce, where practical, those species eliminated from the natural ecosystems
- Identify and perpetuate natural processes in park ecosystems
- Preserve, protect, and interpret cultural resources
- Permit only those types and levels of use or development that do not significantly impair park natural resources, and direct development and use to environments least vulnerable to deterioration
- Limit unnatural sources of air, noise, visual, and water pollution to the greatest degree possible

The plan proposed boundary changes and acquisitions, extensive changes to developed sites, and removal of cars from Yosemite Valley as a long- term goal.

Yosemite Human/Bear Management Plan

The goal of the *Human/Bear Management Plan* is to "restore the natural ecology, distribution, and behavior of black bears through control of human activities." To this end, the plan directs specific actions and responsibilities to reduce the potential for bear/human interaction.

[1] *In the Fire Management Plan, wildland fires are defined as those ignited by lightning and prescribed fires are defined as those ignited by management.*

Yosemite Valley Plan

The National Park Service recently developed the *Yosemite Valley Plan* to implement the goals of the 1980 *General Management Plan* in Yosemite Valley. The *Yosemite Valley Plan* is designed to meet the resource preservation and visitor experience goals in Yosemite Valley, including natural and cultural resource management and restoration, visitor services and recreational opportunities, transportation, and employee housing.

Yosemite Vegetation Management Plan

The *Vegetation Management Plan* addresses the goals and objectives of managing the park's vegetative resources. These goals and objectives seek to:

- Delineate the legislative and administrative requirements that guide development of vegetation management objectives
- Refine the goals and objective for vegetation management established in the *Resources Management Plan*
- Describe the dynamic environment of vegetation within the park and the social, cultural, and natural processes that influence vegetation
- Discuss current vegetation management issues, information needs, and define management objectives, techniques, and strategies for achieving these objectives
- Provide an overview of the history of vegetation management
- Provide a summary of vegetation management planning needs to be addressed in the future, including the roles and responsibilities for planning implementation

Yosemite National Park Rules and Regulations

Fisheries Rules and Regulations

In general, Yosemite National Park has adopted the same fishing regulations as apply to the California Department of Fish and Game management region that contains the park, and requires a valid California fishing license. California Department of Fish and Game maintains jurisdiction over areas outside of Yosemite National Park, where it enforces rules regarding hunting and fishing. The National Park Service has exclusive jurisdiction in the park. Fishing licenses are available for sale at Yosemite Village and Tuolumne Meadows. Licenses can also be purchased in Wawona and El Portal. In 1992, the National Park Service instituted special fishery regulations for the Merced River corridor.

Merced River Management – Standard Operating Procedure

In 1993, the National Park Service ended the practice of removing fallen trees from the river within Yosemite Valley. Previously, fallen trees were removed for bridge protection and to reduce hazards to rafters. Today, fallen trees are considered beneficial for streambank protection, aquatic organisms, and overall health of the riparian and aquatic corridor.

Appendix B: Section 7 Determination

Wild and Scenic Rivers Act Section 7 Determination

Introduction

Purpose, Authority, and Designation

The purpose of this determination is to evaluate whether the impact of the proposed South Fork Merced River Bridge Replacement Project would directly and adversely affect the free- flowing condition and the Outstandingly Remarkable Values for the affected segments of the South Fork Merced River.

The authority for this determination was enacted under Section 7(a) of the Wild and Scenic Rivers Act (PL 90- 542, as amended, 16 USC 1271- 1278). Section 7(a) states, in part:

> "no department or agency of the United States shall assist by loan, grant, license or otherwise in the construction of any water resources project that would have a direct and adverse effect on the values for which such river was established, as determined by the Secretary charged with its administration."

The Wild and Scenic Rivers Act does not prohibit development along a river corridor; however, the act does specify guidelines for the determination of appropriate actions within the bed and banks of a Wild and Scenic River (NPS, DOI, USFS, USDA 1982). As the designated manager for the Merced River segments (including those of the South Fork Merced River) within the boundaries of Yosemite National Park and the El Portal Administrative Site, the National Park Service must prepare a Section 7 determination on all proposed water resources projects (includes bridges and other roadway construction/reconstruction projects[1]) to ensure they do not directly and adversely impact the free- flowing condition or the values for which the river was designated.[2]

Wild and Scenic River Designation

During 1987, Congress designated the Merced River a Wild and Scenic River to protect the free-flowing condition and to protect and enhance its unique values for the benefit and enjoyment of present and future generations (16 USC 1271). This designation provides special protection for the Merced River and designated tributaries under the Wild and Scenic Rivers Act.

Passage of PL 100- 149 (1987) and PL 102- 432 (1992) placed 122 miles of the main stem and South Fork Merced River into the Wild and Scenic River System. Rivers tributary to the Merced, besides the South Fork, and also included were the Red Peak, Merced Peak, Triple Peak, and Lyell. The National Park Service manages 81 miles of the river system (including the Merced River main stem and the South Fork within Yosemite National Park and the El Portal Administrative

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[1] *A water resources project is any dam, water conduit, reservoir, powerhouse, transmission line, or other works project under the Federal Power Act, or other developments that would affect the free-flowing characteristics of a wild and scenic or congressionally authorized study river. In addition to projects licensed by the Federal Energy Regulatory Commission, water resource projects may also include: dams, water diversions, fisheries habitat and watershed restoration, bridges and other roadway construction/reconstruction projects, bank stabilization projects, channelization projects, levee construction, boat ramps, fishing piers, and activities that require a Section 404 permit from the U.S. Army Corps of Engineers (IWSRCC 1999).*

[2] *This description of the Wild and Scenic Rivers Act Section 7 determination process is adapted from a technical report by the interagency Wild and Scenic Rivers Coordinating Council (IWSRCC 1999).*

Site), while the remaining 41 designated river miles are managed by the U.S. Forest Service and the U.S. Bureau of Land Management.

South Fork Bridge Removal and Replacement Project Wild and Scenic Rivers Act Section 7 Determination

The Section 7 evaluation for the South Fork Merced River Bridge Replacement Project has been summarized in table B- 1. This evaluation was based on guidance provided within the Wild and Scenic Rivers Act: Section 7 Technical Report (Interagency Wild and Scenic Rivers Coordinating Council), Appendix C, Evaluation Procedure under the heading Direct and Adverse. The direct and adverse evaluation procedure is carried out for water resources projects licensed by the Federal Energy Regulatory Commission or other federally assisted water resources projects within the Wild and Scenic River boundary of the designated river. The South Fork Bridge lies within the bed and banks of the South Fork Merced River; however, the approaches or detour road to a temporary bypass bridge structure have been constructed on upland soils. All proposed activities will occur within the Wild and Scenic boundary of the South Fork Merced River. The Section 7 determination process presented herein applies only to the Preferred Alternative.

Outstandingly Remarkable Values

Outstandingly Remarkable Values are the river- related values that qualify the river segment as unique and worthy of special protection. They form the basis for the designation as a Wild and Scenic River. Outstandingly Remarkable Values identified for the Wawona area segment of the South Fork Merced River, include:

- Scenic – This segment provides views (of Wawona Dome) from the river and its banks.
- Recreation – This segment offers opportunities to experience a spectrum of river- related recreational activities, from nature study and photography to hiking.
- Biological – This segment contains a diversity of river- related species, wetlands, and riparian habitats. There are federal and state special- status species in this segment, including the Wawona riffle beetle.
- Cultural – This segment contains evidence of thousands of years of human occupation, including numerous prehistoric and historic American Indian villages, historic sites, structures, and landscape features related to tourism, early Army and National Park Service administration, and homesteading.
- Scientific – The entire river corridor constitutes a highly significant scientific resource because the river watershed is largely within designated Wilderness in Yosemite National Park. Scientific Outstandingly Remarkable Values relate to the South Fork and the main stem Merced River values for research. This Outstandingly Remarkable Value applies to all the Merced River segments.

The South Fork Bridge is located within the Wawona Cultural Landscape; however, the bridge is not part of the cultural Outstandingly Remarkable Value because it is not eligible for or listed on the National Register of Historic Places.

Table B-1. Section 7 Evaluation for the South Fork Merced River Bridge Replacement Project

Evaluation Criteria	Project Data
Define the Proposed Activity	
Project Proponent	National Park Service, Yosemite National Park
Purpose and need for the project	The primary purpose of the South Fork Merced River Bridge Replacement Project is to protect public health and safety by removing and replacing the condemned and closed bridge with a wider, safer structure and to discontinue use of the narrow temporary Bailey bridge (installed in 1998 with a limited-use intent that has been exceeded). The need for the proposed project has been established because the South Fork Bridge has been condemned and closed following damage resulting from the 1997 flooding of the South Fork Merced River. Prior to the flood in 1993, the South Fork Bridge was considered to be critically deficient and its expected useful life was determined to be 10 years at reduced loading (from 19 tons to 7 tons) because of steel girder deflection and scouring around the piers. In addition, the temporary Bailey bridge (installed in 1998 following condemnation of the existing structure) is insufficient for current uses because of narrowness, and it has been in place for over four years, which is beyond its intended use of 13 months.
Geographic location of the project	The South Fork Bridge spans the South Fork Merced River and is part of California State Highway 41 (Wawona Road or South Entrance Road), a principle access route into the park. The river flows along the southern border of Yosemite National Park and passes through the Wawona developed area. Wawona is located in Mariposa County in the southwestern corner of the park, about 0.1-mile south of the Wawona ranger office. The coordinates for the bridge site are Universal Transverse Mercator Zone 11, 265145 (Easting) and 4157715 (Northing), NAD27. Refer to figure I-1 of the *South Fork Merced River Bridge Replacement Environmental Assessment*.
Project description	The Preferred Alternative identifies removal of the existing triple-span, steel girder deck South Fork Bridge (approximately 134-feet long and 24-feet wide) with a new, single span bridge (approximately 150-feet long and 42-feet wide) in the same location. The new bridge would be approximately 13-feet wider to accommodate wider travel lanes, shoulders, and a 5-foot wide sidewalk. The new structure height would be similar to that of the old bridge; however, the height of the safety railing would be raised to 2-feet 8-inches to meet present safety standards. The new bridge would span the entire South Fork riverbed and banks without the need for center support piers. Several storm drain drop outlets would be placed in the bridge shoulders for surface drainage. The appearance of the bridge would be similar to the existing bridge, made so by incorporating a natural river cobble façade on the railing posts and interior approach walls, a river rock formliner pattern on the abutments and exterior walls. During demolition, a temporary containment system, such as a reinforced tarp, netting, cage, or floating barge, would be installed beneath the South Fork Bridge to catch any debris that may fall. This containment system would prevent slurry from concrete saws and small debris from falling into the South Fork Merced River. Any debris that is not captured by the containment system, e.g., masonry greater than 2–inches in diameter and all metal debris would be removed from the riverbed. A temporary structural support system consisting of scaffolding, jacks, or mechanical lifts may be installed, if necessary, to prevent uncontrolled collapse of the bridge structure during demolition, or to anchor the containment system. A temporary Bailey bridge was emplaced to carry traffic on Wawona Road, following condemnation and closure of the South Fork Bridge in 1997–1998, due to a catastrophic flood. Because the bypass bridge was part of the original replacement design, impacts related to its placement (e.g., riparian tree removal and disturbance to the riverbank) and removal are addressed within the environmental assessment and in this Section 7 determination. The temporary Bailey bridge was placed approximately 100-feet upriver from the existing bridge and is approximately 200-feet long and 30-feet wide. The South Fork Merced River Bridge Replacement Project alternative would require transferring utility lines from the existing bridge to the temporary Bailey bridge, and back to the new bridge. Utility lines that would require transfer include a 10-inch reclaimed water pipe, an 8-inch sewer pipe, a 4-inch high voltage conduit, and telecommunication lines for telephone and alarm systems. Due to the height of the temporary bypass structure, a lift station may be required to move sewage effectively during construction.

Table B-1. Section 7 Evaluation for the South Fork Merced River Bridge Replacement Project

Evaluation Criteria	Project Data
	Throughout the project, construction staging would occur at the Wawona District Materials Storage Area. Following new bridge construction and temporary bridge removal, the banks would be reshaped and riparian vegetation would be planted to stabilize the riverbanks. The National Park Service would monitor this reach of the South Fork Merced River to ensure that bank loss does not occur.
Duration of the proposed activities	The U.S. Army Corps of Engineers requires demolition activities to occur during low-water months. Therefore, construction would be expected to begin during September 2003, with in-channel activities completed prior to December 2003. During this time frame, flows within the South Fork Merced River would be expected to be below 100-cfs. If in-channel construction is not completed in 2003, activities in the channel will commence during low-flow periods in the summer of 2004. Bridge demolition and some types of construction would be avoided during higher flow periods. The entire project would be completed in approximately 13 months.
Magnitude and/or extent of the proposed activities	Refer to the *South Fork Merced River Bridge Replacement Environmental Assessmen*t, Chapter IV, Environmental Consequences, for detailed data concerning potential impacts of the Preferred Alternative.
Mitigation	The Preferred Alternative would protect Outstandingly Remarkable Values from possible damage due to uncontrolled bridge collapse, remove impediments to the free-flowing condition of the river, and restore natural fluvial processes in the river. Mitigation in the form of Best Management Practices and resource-specific mitigation has been incorporated into the Preferred Alternative. Refer to the *South Fork Merced River Bridge Replacement Environmental Assessment*, Chapter II, Alternatives, for mitigation measures incorporated into the Preferred Alternative.
Relationship to past and future management activities	Bridge replacement, in general, is discussed within the *General Management Plan* and *Yosemite Valley Plan*. The South Fork Merced River Bridge Replacement Project is being executed consistent with the Merced River Plan. Implementation of the Preferred Alternative will not alter management of this river segment.
Describe Whether the Proposed Activity Will Directly Alter Within Channel Conditions	
The position of the proposed activity relative to the streambed and streambanks	The South Fork Bridge is located within the bed and banks of the South Fork Merced River. The portion constructed on uplands, i.e., access to the temporary bridge is discussed in a later section of this table. Demolition and construction activities required to remove and replace the bridge would occur within the bed and banks of the South Fork Merced River.
Any Likely Resulting Changes In:	
Active channel location	Removal of the existing South Fork Bridge, with its two piers, would eliminate an obstruction to the natural flow of the South Fork Merced River. The scour holes present at the base of the piers would be filled with river cobble during the course of demolition/construction. Once the bridge piers are removed, the river channel is expected to return to a more natural flow condition, similar to pre-construction flow conditions. The abutments will be laid back to a more natural contour and will be reconstructed to more effectively protect the banks from erosion. The active channel location would not be altered. The bridge removal and replacement alternative would improve the active channel by returning it to more natural conditions.
Channel geometry (cross-sectional shape, width, depth characteristics)	The Preferred Alternative would remove the two piers from the riverbed and would replace and lay back the bridge abutments. The bridge removal would eliminate an obstruction to natural river flow and would fill scour holes formed at the base of piers with cobble. Eddying resulting from flows around the piers and as a result of flows across the existing abutments would be largely eliminated. The river reach in the immediate vicinity of the South Fork Bridge would be returned to free-flowing conditions, similar to those that existed prior to bridge construction. Overall channel geometry, both in the project vicinity and along the entire reach would be unaffected.
Channel slope (rate or nature of vertical drop)	The current configuration of the South Fork Bridge does not alter the slope of the South Fork Merced River channel. The existing slope through this river reach will remain unaffected by bridge removal and replacement.
Channel form (straight, meandering, or braided)	The South Fork Merced River is a straight river channel underlain by boulders and cobbles through the project area. Removal and replacement of the bridge would not affect the channel form.

Table B-1. Section 7 Evaluation for the South Fork Merced River Bridge Replacement Project

Evaluation Criteria	Project Data
Relevant water quality parameters (turbidity, temperature, nutrient availability)	The removal and replacement of the South Fork Bridge would not result in a long-term net increase or decrease of turbidity, temperature, nutrient availability, or other pollutant loads (sediment, bacteria) within the South Fork Merced River.
Navigation of the river	River navigation is not applicable to this section of the South Fork Merced River.
Describe Whether the Proposed Activity Will Directly Alter Riparian and/or Floodplain	
The position of the proposed activity relative to the riparian area and floodplain	The South Fork Bridge is located within the bed and banks of the South Fork Merced River, both below ordinary high water and within the 100-year floodplain. The access road to the temporary bypass bridge and utility lines are located on uplands within the 100-year floodplain.
Any Likely Resulting Changes In:	
Vegetation composition, age structure, quantity, or vigor	Two large trees have already been removed to accommodate installation of the temporary Bailey bridge, under emergency actions following condemnation of the South Fork Bridge. The possible removal of trees could occur; however, trees would only be removed if deemed necessary. Should trees require removal, the National Park Service would either cut and remove the trees from the site, cut and retain the tree to contribute woody debris to the river, or destabilize and control the fall of trees to retain woody debris and a natural-appearing fallen tree with root ball attached. Following construction activities, regrading and revegetation with native riparian tree and shrub species would occur and help to restore the vegetation integrity at this site. In addition, removal of the bridge piers would help to restore the free-flowing condition of the river and return this portion of the South Fork Merced River to a more natural state.
Relevant soil properties such as compaction or percent bare ground	No long-term adverse impact to soil resources is anticipated. The project would result in removal and restoration of former informal earthen parking lots, particularly in the northeastern quadrant, reducing soil compaction and improving riverbank and adjacent upland soil conditions.
Relevant floodplain properties such as width, roughness, bank stability, or susceptibility to erosion	Currently, the South Fork Bridge impedes river flow because of the two piers. The bridge can act as a debris dam, forcing floodwaters to leave the riverbanks and flood areas near the river. Because the project would remove the piers and span the river with a new single-span bridge, the river has ample capacity to pass large woody debris and floodwaters without overbank flooding. The project restores the river to more natural flow conditions and, therefore, would reduce the potential for flooding due to river impediments. The project would have a positive effect on the natural floodplain properties within this river reach. Removal and replacement of the abutments would result in a minor beneficial effect to floodplain properties, because the new abutments would be laid back and could accept slightly higher flows. Riparian vegetation would be planted into sites disturbed during construction, including the temporary bridge site. The National Park Service would monitor this site on the South Fork Merced River, to ensure that bank loss does not occur. Should future river processes erode the bank in the vicinity of abutment replacement activities, then use of boulders and other naturally occurring river materials could be considered for stabilizing the banks.
Describe Whether the Proposed Activity Will Directly Alter Upland Conditions	
The position of the proposed activity relative to the uplands	The Preferred Alternative is located primarily on the bed and banks of the South Fork Merced River. Uplands have been impacted by the placement of the temporary bypass road and bridge that carries traffic around the condemned South Fork Bridge. Utility lines are present in upland soils. Restoration of upland sites impacted by the Preferred Alternative will be undertaken, including regrading and revegetation using native species.
Any Likely Resulting Changes In:	
Vegetation composition, age structure, quantity, or vigor	Disturbed upland sites currently dominated by sparse stands of annual plant species would be revegetated using native species of grasses, forbs, shrubs, and trees. The site composition would shift from largely non-native annual species to native perennial herbaceous species. In addition, the composition would benefit from the introduction of native grass, forb, shrub, and tree species. The introduction of seedling shrubs and trees would affect the current vegetation structure and enhance its value as wildlife habitat. There would be no affect to age structure or vigor of upland vegetation as a result of project implementation.

Table B-1. Section 7 Evaluation for the South Fork Merced River Bridge Replacement Project

Evaluation Criteria	Project Data
Relevant soil properties such as compaction or percent bare ground	Areas of upland soils were adversely affected prior to bridge condemnation and closure due to the use of some sites as informal parking areas and other sites for installing utility lines. Soils under the asphaltic concrete of the temporary bypass road have been graded and compacted to provide an adequate base for road construction. The amount of bare ground present has probably decreased somewhat due to invasion by mostly annual plant species that has occurred on exposed upland soils formerly used as parking areas. There has been compaction of soils due to the temporary Bailey bridge access road placement that would be mitigated by using revegetation techniques.
Relevant hydrologic properties such as drainage patterns or the character of surface and subsurface flows	Runoff onto upland soils from paved surfaces has increased as a result of bypass bridge access road construction. At least one area adjacent to the temporary access road in the northeastern project quadrant ponds water somewhat, resulting in a more mesic habitat. A culvert has been installed under the temporary roadway to carry water to the river via a minor drainage. Implementation of the Preferred Alternative would have only minor effects to upland drainage patterns, due to regrading the site following construction.
Potential changes in upland conditions that would influence archeological, cultural, or other identified significant resource values	There is a low probability that earth-disturbing activities in the northwestern project quadrant, where cultural resource inventories have not yet been conducted, could result in adverse effects to archeological resources. A mounded area of undisturbed upland soils would be disturbed by abutment removal and replacement, resulting in a potentially adverse effect to archeological resources that may be present in this site. The National Park Service would evaluate this site prior to any earth-disturbing activities. Mitigation for archeological resources has been described in the *South Fork Merced River Bridge Replacement Environmental Assessment*, Chapter II, Alternatives.
Evaluate and Describe Whether Changes in Onsite Conditions Can or Will Alter Existing Hydrologic or Biologic Processes	
The ability of the channel to change course, reoccupy former segments, or inundate its floodplain	Currently, the South Fork Bridge acts as an impediment to river flow, and could act as a debris dam during high-water events. The river is deeply incised through this reach (from 20–30-feet deep), well armored with boulders and cobble, and is unlikely to change course. Because the project would remove impediments and the river has ample capacity, it would not be expected to overflow its banks at flood stage. The project restores the natural river flow conditions and therefore, would reduce the potential for storm-stage flooding due to damming effects.
Streambank erosion potential, sediment routing and deposition, or debris loading	Streambank erosion potential is highest when river flow is constricted by an in-stream structure such as a bridge. The Preferred Alternative would remove the piers, thereby removing impediments and restoring flows to more natural conditions, and restoring natural erosion, sedimentation, and depositional processes. Some bank erosion was observed on the South Fork Merced River right bank, below the existing bridge, due to eddying during high-flow events. It is unknown if the eddying was the result of abutment placement effects or from flows around the northernmost pier, or a combination of the effects of both structures. Additional riverbank erosion was observed on the left bank, upriver of the abutment. The piers would be removed and the abutments would be removed and replaced using a design to pass high flows with less downstream effect. Sediment deposition within this river reach would be unlikely due to the slope and incised nature of the streambed. Sediments would likely be rapidly transported through this reach to be deposited downstream where the gradient lessens, the riverbed widens, and the flow slows. The removal of two existing piers from the streambed would eliminate the potential for debris loading at this structure.
The amount or timing of flow in the channel	The removal and replacement of the South Fork Bridge would not affect flow rates or discharge of the river.
Existing flow patterns	Removal of the bridge piers would eliminate an impediment to flows that has resulted in scour holes forming in the riverbed around the base of the piers. Once the piers are removed, the river is expected to return to a more natural flow condition, similar to flows that existed prior to bridge construction. The piers would no longer be present to potentially trap large woody and other debris, thus pooling floodwater behind the structure with the potential for downstream overbank flooding. Reconstruction of the abutments would only slightly minimize any presently occurring adverse effects related to their presence on the riverbank and in the edge of the riverbed.
Surface and subsurface flow characteristics	The removal and replacement of the South Fork Bridge would not affect surface or subsurface flow characteristics. No portion of the Preferred Alternative, including equipment staging, demolition activities, or materials storage, would be located within or otherwise affect surface or subsurface drainage patterns from the uplands to the South Fork Merced River.
Flood storage (detention storage)	Removal of two instream piers would eliminate the potential for large woody debris damming the river and backing floodwaters behind the bridge structure. Otherwise, there would be no measurable effect to flood storage as a result of the Preferred Alternative.

Table B-1. Section 7 Evaluation for the South Fork Merced River Bridge Replacement Project

Evaluation Criteria	Project Data
Aggregation and/or degradation of the channel	The channel of the South Fork Merced River, at the base of the existing piers, has already degraded due to scour hole development. During removal of the piers, these scour pools would be filled with cobble to allow natural river flows to occur. Following this action there would be no measurable effect to aggregation/degradation of the channel as a result of the proposed project. Removing the piers would help to restore natural flows, and also natural bed erosion, sedimentation, and depositional processes.
Biological Processes Such As:	
Reproduction, vigor, growth and/or succession of streamside vegetation	Removal of the temporary bridge structure and regrading and revegetation of disturbed riverbanks would help to restore vegetation integrity at this site. Removal of the instream piers would help to restore the free-flowing condition of the South Fork Merced River and return this reach of the river to a more natural condition, thereby enhancing the biological integrity. Minor regrading and revegetation in this area would improve bank and vegetation integrity.
Nutrient recycling	No measurable effect to nutrient cycling is anticipated. The Preferred Alternative would have a minor effect on riparian vegetation and would not adversely affect woody debris or free-flowing characteristics (major contributing components of riverine nutrient cycling) of the South Fork Merced River. Local nutrient availability and cycling may be temporarily affected during the demolition period due to an increased amount of fine sediment released in the river. However, the sediment dislodged by construction associated with the Preferred Alternative is anticipated to be minor. In the long term, nutrient availability would be enhanced because the minor regrading and revegetation would improve bank and vegetation integrity.
Fish spawning and/or rearing success	No measurable effect to fish spawning and/or rearing success is anticipated. The river in the vicinity of the South Fork Bridge is moderately swift and has a small amount of fish spawning or rearing habitat (e.g., riffles, pools, gravel substrate). Pools scoured adjacent to the piers of the existing structure would be filled with cobble. Minor regrading and revegetation following construction would increase bank integrity, improving fish habitat somewhat. The extent and quality of fish habitat throughout the remainder of the South Fork Merced River corridor would be unaffected.
Riparian-dependent avian species needs	No measurable effect to riparian dependent avian species is anticipated. The river in the vicinity of South Fork Bridge supports limited riparian vegetation. Small amounts of riparian vegetation would be removed under the Preferred Alternative (including that already removed due to temporary bridge installation). The extent and quality of avian habitats throughout the remainder of the South Fork Merced River corridor would be unaffected.
Amphibian/mollusk needs	No measurable effect to amphibians/mollusks is anticipated. The river in the vicinity of the South Fork Bridge is moderately swift and provides minimal amphibian and mollusk habitat, particularly in sparse stands of willow growing upstream of the bridge. The Preferred Alternative would not have an adverse effect on amphibian or mollusk needs. The extent and quality of amphibian and mollusk habitats throughout the remainder of the South Fork Merced River corridor would be unaffected.
Species composition (diversity)	No measurable effect to species composition or diversity is anticipated. Upon project completion, the biological integrity of the site would be enhanced.
Estimate the Magnitude and Spatial Extent of Potential Offsite Changes	
Consider and Document:	
Changes that influence other parts of the river system	The effects of the Preferred Alternative are localized and will not result in changes that will influence other portions of the South Fork Merced River or the Merced River system.
The range of circumstances under which offsite changes might occur (for example, as may be related to flow frequency)	Following removal of the instream piers, river flow will no longer be impeded at this site and natural flow processes will predominate. There are no obvious circumstances under which offsite change would occur.
The likelihood that predicted changes will be utilized	The predicted change resulting from the Preferred Alternative would be more natural, unimpeded flows restored for this river reach. There is every indication that this predicted change would occur.

Table B-1. Section 7 Evaluation for the South Fork Merced River Bridge Replacement Project

Evaluation Criteria	Project Data
Specify processes involved such as water and sediment and the movement of nutrients	Natural processes of fluvial dynamics (free flow) and sediment transport would be enhanced upon completion of the Preferred Alternative.
Define the Time Scale Over Which Steps 3–6 are Likely to Occur	
Review steps 3–6, looking independently at the element of time. Define and document the time scale over which the effects will occur.	The temporary bridge has already been installed as part of an emergency action during 1998, following the catastrophic floods of 1997. Demolition of the existing bridge would begin in September 2003 and be complete before December 2003. Construction of the new bridge (and subsequent removal of the temporary bridge) would occur from approximately October 2003 and would be complete prior to October 2004. Riverine system adjustment to a natural hydrologic regime would be immediate.

Effects of the Proposed Action on Outstandingly Remarkable Values

Under the Preferred Alternative, the South Fork Bridge would be removed and a single- span structure constructed in its place. Overall, the Preferred Alternative would have localized beneficial effects on the scenic, recreation, and biological Outstandingly Remarkable Values. Removal and replacement of the South Fork Bridge could have localized adverse effects on archeological resources, if they are present in a currently undisturbed and unevaluated portion of the riverbank. The effects of the Preferred Alternative on Outstandingly Remarkable Values are summarized below and discussed in further detail in table B- 2. Generally, the effects of the Preferred Alternative would be localized and limited to the immediate South Fork Bridge project area, thus having no effect on the scenic, recreation, biological, and cultural processes or Outstandingly Remarkable Values on a segment- wide level.

With respect to the scenic Outstandingly Remarkable Value, the Preferred Alternative would provide a sidewalk on the upriver side of the new bridge, from which visitors could view the South Fork Merced River and the interface of river, rock, meadow, and forest and the Wawona Dome. The barricaded and condemned South Fork Bridge and the temporary Bailey bridge would no longer visually intrude upon views from the riverbank and river, the parking area, Forest Drive and Chilnualna Falls Road, and the Wawona Golf Course, which would beneficially affect the scenic Outstandingly Remarkable Value. The Preferred Alternative would enhance the scenic Outstandingly Remarkable Value on a localized level by providing the sidewalk from which river and landscape viewing is possible. On a segment- wide level, the Preferred Alternative would have no effect on the scenic Outstandingly Remarkable Value.

With respect to the recreation Outstandingly Remarkable Value, the Preferred Alternative would provide a sidewalk across the bridge that would allow opportunities to experience a spectrum of passive river- related recreational activities and facilitate exercise in the form of walking, jogging, hiking, and bicycling, in addition to providing views of the Wawona Golf Course. Provision of the sidewalk would negligibly enhance the recreation Outstandingly Remarkable Value on a local level. On a segment- wide level, the Preferred Alternative would have no effect on the recreation Outstandingly Remarkable Value.

With respect to the biological Outstandingly Remarkable Value, the Preferred Alternative would involve minor regrading and revegetation of the riverbanks in the immediate vicinity of the bridge, the site of the temporary bridge, and the uplands supporting the temporary bridge access, which would have site- specific, long- term, beneficial effects on bank and vegetation integrity. Catastrophic collapse of the bridge under the No Action Alternative could result in extensive erosion, a release of bridge debris, and releases of reclaimed water and untreated sewage that could temporarily affect downstream riparian and aquatic resources and river- related special status species. The Preferred Alternative would avoid these impacts to biological resources in general; however, individuals of the Wawona riffle beetle, a special- status insect that could receive adverse effects due to demolition and construction activities, may be present on the project site. These short- term effects would be offset by the long- term benefits from the restoration of riparian vegetation in the project area. Although the Preferred Alternative would locally enhance this Outstandingly Remarkable Value, on a segment- wide level, the Preferred Alternative would have no effect on the biological Outstandingly Remarkable Value.

Table B-2. Impacts of the Preferred Alternative on Outstandingly Remarkable Values of the South Fork Merced River

Outstandingly Remarkable Value	Effects of the Preferred Alternative
Scenic — This segment provides views from the river and its banks (of Wawona Dome)	The Preferred Alternative would provide a sidewalk on the upstream side of the bridge from which river views would be possible. The views of most interest from the South Fork Bridge would include the river, banks, and riparian vegetation; the historic Covered Bridge; Wawona Dome; forested slopes; the Wawona Golf Course; and the Wawona Store. The Preferred Alternative would protect the scenic Outstandingly Remarkable Value on a localized level by providing a sidewalk that allows viewing opportunities. On a segment-wide level, the Preferred Alternative would contribute negligibly to the enhancement of the scenic Outstandingly Remarkable Value. The Preferred Alternative would have no effect on the scenic Outstandingly Remarkable Value on a segment-wide level.
Recreation — This segment offers opportunities to experience a spectrum of river-related recreational activities, from nature study and photography to hiking	The Preferred Alternative would provide wider shoulders and a sidewalk on the upstream side of the new bridge, which would allow opportunities to experience a spectrum of river-related recreational activities. These activities include sightseeing, photography, and nature study over the long term. Sidewalk construction would negligibly enhance the recreation Outstandingly Remarkable Value on a localized level, because the effects would be limited to the immediate vicinity of the South Fork Bridge and there would be no effect on the spectrum of river-related recreational activities throughout the remainder of the South Fork Merced River corridor. Although the Preferred Alternative would have localized beneficial effects, on a segment-wide level the Preferred Alternative would have no effect on the recreation Outstandingly Remarkable Value.
Biological — This segment contains a diversity of river-related species, wetlands, and riparian habitats. There are federal and state special-status species in this segment, including the Wawona riffle beetle	The Preferred Alternative would involve regrading and revegetation of the riverbanks in the immediate vicinity of the South Fork Bridge and the temporary bridge structures, which would have site-specific, long-term, beneficial effects on the bank and vegetation integrity. The Preferred Alternative would also improve riparian, wetland, and aquatic habitat for a diversity of river-related species, including special-status species. Under the No Action Alternative, the South Fork Bridge would collapse over time and potentially result in damming, flooding, bank erosion, and release of bridge debris downstream, which could temporarily affect riparian and aquatic resources and river-related special-status species. The Preferred Alternative would avoid these impacts to biological resources. The effects of the Preferred Alternative would be limited to the South Fork Bridge area near Wawona, and would have no effects on river-related biological resources throughout the remainder of the South Fork Merced River corridor. The Preferred Alternative would locally enhance this Outstandingly Remarkable Value, however, on a segment-wide level. The Preferred Alternative would have no effect on the biological Outstandingly Remarkable Value.
Cultural — This segment contains evidence of thousands of years of human occupation, including numerous prehistoric and historic American Indian villages, historic sites, structures, and landscape features related to tourism, early Army and National Park Service administration, and homesteading	There is a low probability that removal of the South Fork Bridge and replacement with a longer structure could have an adverse impact to archeological resources due to ground-disturbing activities. The adverse effects would be limited to the immediate vicinity of the South Fork Bridge, and would have no effect on archeological resources throughout the park. Although the Preferred Alternative would have a localized adverse effect, on a segment-wide level, the Preferred Alternative would have no effect on the cultural Outstandingly Remarkable Value. Ethnographic resources, including traditional use areas, would not be affected under the Preferred Alternative.
Scientific — The entire river corridor constitutes a highly significant scientific resource because the river watershed is largely within designated Wilderness in Yosemite National Park. Scientific Outstandingly Remarkable Values relate to the Merced River value for research. This outstandingly Remarkable Value applies to all the Merced River and South Fork segments.	The Preferred Alternative would remove the condemned South Fork Bridge and the temporary Bailey bridge. South Fork Bridge demolition would be conducted in a controlled manner to avoid collapse, would incorporate a containment system to capture debris, and would result in removing two piers from the riverbed. Pier removal would result in a more natural flow regime, establishment of additional habitat to support the Wawona riffle beetle, and restoration of riverbank vegetation following construction. The Preferred Alternative would have a beneficial localized effect to the protection of the scientific Outstandingly Remarkable Value; however, there would be no effect on the scientific Outstandingly Remarkable Value on a segment-wide basis.

The Preferred Alternative would remove impediments to flow and avert possible future catastrophic collapse of the bridge structure. Such a collapse could introduce untreated sewage and reclaimed water into the river from utility line breaks, which would become more dilute as the spill progressed downriver. On a local and segment- wide basis, the Preferred Alternative would have a beneficial effect on the scientific Outstandingly Remarkable Value.

Section 7 Determination

The Preferred Action would remove two human- made structures from the bed and banks of the South Fork Merced River, i.e., the South Fork Bridge and the temporary Bailey bridge, and replace them with a single- span bridge structure on the banks of the South Fork Merced River. Replacement of the South Fork Bridge is necessary because the bridge serves as a primary access road into the park for over one- third of park visitors, staff, and local residents over the South Fork Merced River via Wawona Road. Free flow and natural fluvial processes, including sediment transport, natural erosion, and deposition, would be largely restored to this reach of the South Fork Merced River due to the removal of two in- stream piers and replacement of river-narrowing abutments. Upon removal of the existing South Fork Bridge, piers, and abutments, the localized flow will no longer be obstructed and the action will reduce erosion of the riverbank and the potential for storm- stage flooding caused by material accumulation behind the bridge structure. Reduction of the flood hazard will reduce over- bank flooding and associated erosion during large storm events. Removal of the existing and temporary structures and completely spanning the river with a new structure would beneficially affect scenic, recreation, biological, and scientific Outstandingly Remarkable Values on a localized level. Localized adverse affects could result to the archeological components of the cultural Outstandingly Remarkable Value, dependant on the results of site- specific surveys. On a segment- wide basis, however, Wawona Area Outstandingly Remarkable Values would not be appreciably affected. The Preferred Action would improve views from the riverbank and bridge structure, return the riverbanks and bed to a more natural state, benefiting riparian, wetland, and aquatic resources, and restore the active flood regime and fluvial processes. The National Park Service concludes that the Preferred Action will enhance free flow of the South Fork Merced River and will not have a segment- wide direct and adverse effect on the Outstandingly Remarkable Values for which the river was designated Wild and Scenic.

Recommended:

Superintendent, Yosemite National Park Date

Approved:

Regional Director Pacific West Region, National Park Service Date

Appendix C: Special-Status Species Evaluation

Purpose of this Appendix

The National Park Service has prepared the *South Fork Merced River Bridge Replacement Environmental Assessment* to guide the future of the South Fork Merced River Bridge Replacement Project. This appendix evaluates the potential effects of the Preferred Alternative on federally protected and other special- status species.

The Federal Endangered Species Act of 1973, as amended, requires all federal agencies to consult with the U.S. Fish and Wildlife Service before taking actions that could jeopardize the continued existence of species that are listed or proposed to be listed as threatened or endangered, or could result in the destruction or adverse modification of critical or proposed critical habitat. The first step in the consultation process is to obtain a list of protected species from the U.S. Fish and Wildlife Service, accomplished on October 2, 2002.

In addition, *National Park Service Management Policies* (2001) directs parks to manage state and locally listed species in a manner similar to its treatment of federally listed species, to the greatest extent possible. National Park Service policy also directs parks to manage native species that are of special management concern (such as rare, declining, sensitive, or unique species and their habitats) to maintain their natural distribution and abundance.

Also included in this analysis are park rare species. Park rare species are those that have no other status (either state or federal), have extremely limited distributions in the park and may represent relict populations from past climatic or topographic conditions, may be at the extreme extent of their range in the park, or represent changes in species genetics. Presently, the Yosemite National Park rare species list only applies to plant species, because a separate list for wildlife species has not yet been prepared. They are included in this analysis because they could be affected (due to proximity to human- use zones, or susceptibility of individual plants or populations to loss from natural or unnatural events), and their existence is considered when evaluating consequences for any proposed management action.

This evaluation is prepared in accordance with Section 7 of the Federal Endangered Species Act, and implementing regulations (19 USC 1536(c), 50 CFR 402.14(c)), National Environmental Policy Act requirements (USWC 4332(2)(c)), and direction provided in the 1988 *National Park Service Management Policies* (4:11). The purpose of this document is to:

- Evaluate the effects of the Preferred Alternative on special- status species or their critical habitat that are known to be or could be present within the project area.
- Determine the need for consultation and conference with the U.S. Fish and Wildlife Service.
- Conform to requirements of the Federal Endangered Species Act (19 USC 1536(c), 50 CFR 402) and the National Environmental Policy Act (42 USC 4321 *et seq*., implemented at 40 CFR Parts 1500–1508).
- The National Park Service will submit this evaluation to the U.S. Fish and Wildlife Service as the next step in the consultation process. The U.S. Fish and Wildlife Service will review the evaluation and determine if formal consultation under the Federal Endangered Species Act is required. The U.S. Fish and Wildlife Service will render a letter of

concurrence stating that the Preferred Alternative is not likely to adversely affect a federally listed species or critical habitat.

Species Evaluated

The various federal, state, and National Park Service categories for special status species evaluated herein are defined below:

- Federal endangered: Any species that is in danger of extinction throughout all or a significant portion of its national range.
- Federal threatened: Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its national range.
- Federal species of concern: Any species that may become vulnerable to extinction on a national level from declining population trends, limited range, and/or continuing threats (note this is no longer an official U.S. Fish and Wildlife Service category, but is still considered in this document because it contains many species that could become threatened or endangered).
- California endangered: Any species that is in danger of extinction throughout all or a significant portion of its range in the state.
- California threatened: Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its state range.
- California species of special concern: Any species that may become vulnerable to extinction on a state level from declining population trends, limited range, and/or continuing threats; could become threatened or endangered.
- California rare plants: Identified by the National Park Service based upon the following criteria:
  - Locally rare native
  - Listed by the California Native Plant Society
  - Endemic to the park or its local vicinity
  - At the furthest extent of its range
  - Of special importance to the park (identified in legislation or park management objectives)
  - The subject of political concern or unusual public interest
  - Vulnerable to local population declines
  - Subject to human disturbance during critical portions of its life cycle

Based on data gathered from the National Park Service, U.S. Fish and Wildlife Service (USFWS 2002), and the California Natural Diversity Database (CDF&G 1999b), table C- 1 presents summary information on federally listed threatened or endangered species; species of concern (former federal category 2 species); state- listed threatened, endangered, and rare species; and species that are locally rare or threatened considered in this evaluation. A total of 60 special-status species (55 wildlife species and 5 plant species) have been considered in the evaluation of this project. Additional data on these species are included in the biological assessments for the *Merced Wild and Scenic River Comprehensive Management Plan* and *Yosemite Valley Plan* on file at Yosemite National Park.

Species Removed from Further Analysis

Several species listed in table C- 1 below, have been removed from further analysis. Refer to Chapter III, Affected Environment, for background data on the species evaluated further and Chapter IV, Environmental Consequences, for information regarding potential impacts of the No Action and Preferred Alternatives. The National Park Service has determined that the special-status species removed from further analysis would not be affected by the Preferred Alternative because they do not occur in the project area. Therefore, there would be no direct, indirect, or cumulative effect on these species from the alternatives. These species are not evaluated further in this environmental assessment.

Critical Habitat

Critical habitat is a specific or type of area that is considered to be essential for the survival of a species as designated by the U.S. Fish and Wildlife Service under the Federal Endangered Species Act. Critical habitat has not been designated for any federally listed species that is known or has potential to occur within the project area.

Table C-1. Federal and State Threatened and Endangered Species and Species of Special Concern

Species[1]	Federal Status	State Status	Yosemite National Park Status[2]	Habitat	Determination
Federally listed Endangered, Threatened, Proposed, or Candidate Species					
Amphibians and Reptiles					
*California red-legged frog *Rana aurora draytonii*	FT	CSC	NA	This species is found in quiet pools in permanent streams of mixed conifer habitat and foothill areas. It prefers riparian deciduous habitat. Many specimens were collected historically from one park lake at 6,000 feet elevation. It was also once found in Yosemite Valley, but is now apparently extinct.	Considered further in this analysis. Suitable habitat for this species occurs within the channel of the South Fork Merced River. However, surveys have indicated that this species may be extirpated from Yosemite National Park. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
Fish					
*Central valley (Kalamath Mountains Province) steelhead *Onchorhynchus mykiss*	FT	—	NA	This species occurs in the Sacramento-San Joaquin estuary and tributaries. Though the species does not occur in Yosemite National Park, the park contains the headwaters of tributaries that feed into downstream habitat for the species.	Removed from further analysis. This species does not occur within Yosemite National Park. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.
*Sacramento splittail *Pogonichthys macrolepidotus*	FT	—	NA	Habitat for this species includes tidal fresh and brackish waters of the Sacramento-San Joaquin delta, Suisun Bay, tidal marshes in Suisan, Napa, and Petaluma, and the main stem of the Sacramento River. Though the species does not occur in Yosemite National Park, the park contains the headwaters of tributaries that feed into downstream habitat for the species.	Removed from further analysis. This species does not occur within Yosemite National Park. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.
*Delta smelt *Hypomesus transpacificus*	FT	CT	NA	This species occurs only in Suisun Bay and the Sacramento-San Joaquin estuary near San Francisco Bay. Though the species does not occur in Yosemite National Park, the park contains the headwaters of tributaries that feed into downstream habitat for the species.	Removed from further analysis. This species does not occur within Yosemite National Park. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.
Central valley fall/late fall-run chinook salmon *Oncorhynchus tshawytscha*	CAN	—	NA	This species occurs in the Sacramento and San Joaquin river systems to spawn in October through February. Oceanic distribution is off coastal California.	Removed from further analysis. This species does not occur within Yosemite National Park. There is not expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.
Birds					
*Bald eagle *Haliaeetus leucocephalus*	FT	CE	NA	This species forages over river, stream, and lake habitats in the park. It primarily forages for fish, but also carrion, waterbirds, and small mammals. It is transient in the park and does not nest.	Considered further in this analysis. This species is expected as a transient visitor to the greater project area. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.

Table C-1. Federal and State Threatened and Endangered Species and Species of Special Concern

Species[1]	Federal Status	State Status	Yosemite National Park Status[2]	Habitat	Determination
Federal and California Species of Concern					
Invertebrates					
*Wawona riffle beetle *Atractelmis wawona*	FSC	—	NA	This species occurs in the South Fork Merced River and in the main stem Merced River within the park. It is associated with aquatic mosses attached to cobble substrate.	Considered further in this analysis. Suitable habitat for this species occurs within the channel of the South Fork Merced River. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
*Merced Canyon shoulderband (Yosemite sideband) snail *Helminthoglypta allynsmithi*	FSC	—	NA	This species is found in rockslide habitat with shade and moisture. It has been recorded in the Merced River Canyon near El Portal.	Removed from further analysis. Suitable habitat for this species is absent from the project area. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not further evaluated.
*Yosemite mariposa sideband snail *Monadenia hillebrandi yosemitensis*	FSC	—	NA	This species occurs in rockslide habitat with shade and moisture. Reported in the Yosemite Valley in the early 1900s.	Removed from further analysis. Suitable habitat for this species is absent from the project area. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.
*Bohart's blue butterfly *Philotiella speciosa bohartorum*	FSC	—	NA	This species occurs near Briceburg in the Merced River Canyon. It uses a plant of serpentine soils, Chorizanthe membranacea as its principal food source. It was last recorded in 1970.	Removed from further analysis. Suitable habitat for this species is absent from the project area. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not further evaluated.
*Sierra pygmy grasshopper *Tetrix sierrana*	FSC	—	NA	This species has been collected from El Portal in 1953 and only one other record in Madera County is known. Its habitat requirements are unknown (NPS 1996a).	Removed from further analysis. Habitat for this species is unlikely to occur in the project area. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not further evaluated.
Amphibians and Reptiles					
*Mount Lyell salamander *Hydromantes platycephalus*	FSC	CSC	NA	Found in the high Sierra Nevada, mostly over 8,000', but between 4,000-12,000' elevation. Found in massive granite exposures, talus, and rock fissures, near seepages from streams or melting snow, also in spray zone of waterfalls. Apparently prefers north-facing slopes.	Removed from further analysis. Suitable habitat for this species is absent from the project area. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.
*Foothill yellow-legged frog *Rana boylii*	FSC	CSC	NA	This species was considered formerly abundant and was found up to elevations of 6,000 feet. It has virtually disappeared from its range in the Sierra Nevada from unknown causes. The preferred habitat was rocky streams and wet meadows.	Considered further in this analysis. Suitable habitat for this species is present within the project area; however, the site is at a lower elevation. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.

Table C-1. Federal and State Threatened and Endangered Species and Species of Special Concern

Species[1]	Federal Status	State Status	Yosemite National Park Status[2]	Habitat	Determination
Mountain yellow-legged frog *Rana muscosa*	FSC	CSC	NA	This species is restricted to the Sierra Nevada at elevations of 4,500-12,000 feet. Occupies riverbanks, meadow streams, isolated pools and lake borders.	Removed from further analysis. Suitable habitat for this species is present within the project area, but the species has not been observed. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.
*Northwestern pond turtle *Clemmys marmorata marmorata*	FSC	CSC	NA	This subspecies is found in the Sierra Nevada up to 6,000 feet elevation. It has decreased by up to 80% in numbers, likely due to habitat fragmentation and non-native predators. Habitat is permanent water in a variety of habitat types. Recent records include several from Crane Creek at El Portal and an unconfirmed report in the Yosemite Valley in 1999.	Considered further in this analysis. Suitable habitat for this species is present in the project area, but the species has not been observed. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
*Southwestern pond turtle *Clemmys marmorata pallida*	FSC	CSC	NA	This subspecies is found in the Sierra Nevada up to 6,000 feet elevation. It has decreased by up to 80% in numbers, likely due to habitat fragmentation and non-native predators. Recent records include several from Crane Creek at El Portal and an unconfirmed report in the Yosemite Valley in 1999.	Considered further in this analysis. Suitable habitat for this species is present in the project area, but the species has not been observed. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
Fish					
*Longfin smelt *Spirinchus thaleichthys*	FSC	—	NA	This species may be extirpated from the San Francisco Bay-Sacramento-San Joaquin estuary, possibly due to sedimentation. Spawn in fresh water close to the ocean, over sandy-gravel substrates, rocks, or aquatic plants.	Removed from further analysis. Suitable habitat for this species is absent from the project area. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.
Birds					
*Little willow flycatcher *Empidonax traillii brewsteri*	—	CE	NA	Habitat not described, but assumed similar to that of the willow flycatcher. The willow flycatcher breeds in mountain meadows and riparian areas with lush growth of shrubby willows from 2,000 to 8,000 feet in elevation.	Considered further in this analysis. This subspecies may occur within Yosemite, and there are recent records of willow flycatchers at Wawona. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
*American peregrine falcon *Falco peregrinus anatum*	FD	CE	NA	This species occupies high cliff habitats over or near water to search for prey. Three active nest sites are present in the Yosemite Valley.	Considered further in this analysis. This species is expected as a transient visitor to the greater project area. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.

Table C-1. Federal and State Threatened and Endangered Species and Species of Special Concern

Species[1]	Federal Status	State Status	Yosemite National Park Status[2]	Habitat	Determination
Northern goshawk *Accipiter gentilis*	FSC	CSC	NA	This species occupies a wide variety of forest types, including moderately dense coniferous and mixed forest types broken by meadow and other openings, between 5,000 and 9,000 feet elevation. They are generally associated with remote habitat, away from human contact. It has been recorded in Yosemite Valley between November and February.	Removed from further analysis. Habitat for this species is present in the project area, however the site has a large number of visitors and is at a lower elevation, making the habitat less than suitable.
*Tricolored blackbird *Agelaius tricolor*	FSC	CSC	NA	This species occupies fresh water marshes with cattail, tule, bulrush, and sedge. Occurs in open cultivated land and pastures during migration.	Removed from further analysis. Suitable habitat for this species is absent from the project area. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.
*Short-eared owl *Asio flammeus*	FSC	—	NA	This species occupies grasslands, old fields, croplands, and herbaceous wetland habitats. It requires broad expanses of open land with low vegetation for nesting and foraging.	Removed from further analysis. Suitable habitat for this species is absent from the project area. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.
*Lawrence's goldfinch *Carduelis lawrencei*	FSC	—	NA	This species occupies oak and riparian woodland, chapparal, pinyon-juniper woodland, and weedy areas, usually near water.	Removed from further analysis. Suitable habitat for this species is absent from the project area. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.
Vaux's swift *Chaetura vaux*i	FSC	—	NA	This species occupies mature forests, but also forages over open country. It has occurred in mature and old-growth coniferous, hardwood, and mixed forests and riparian habitats.	Considered further in this analysis. Suitable habitat for this species is present in the project area. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
Olive-sided flycatcher *Contopus cooperi*	FSC	—	NA	This species occupies coniferous, hardwood, and mixed forest stands, and woodlands, including riparian habitat. The primary habitat is mature, evergreen montane forest.	Considered further in this analysis. Suitable habitat for this species is present in the project area. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
*Black tern *Chilidonias niger*	FSC	—	NA	This species may be found on grasslands or herbaceous wetlands, but is more common to mashes, sloughs, rivers, lakeshores, and impoundments. They have been observed using low gradient medium to big river habitat.	Removed from further analysis. Suitable habitat for this species is absent from the project area. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not further evaluated.
*Black swift *Cypseloides niger*	FSC	—	NA	This species is an aerial-feeding bird that forages over forest and in open areas. It nests behind or next to waterfalls and wet cliffs.	Considered further in this analysis. Suitable habitat for foraging exists in the project area. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.

Table C-1. Federal and State Threatened and Endangered Species and Species of Special Concern

Species[1]	Federal Status	State Status	Yosemite National Park Status[2]	Habitat	Determination
*Hermit warbler *Dendroica occidentalis*	FSC	—	NA	This species occupies conifer and mixed conifer forests, shrublands, and woodlands. It prefers mature stands of pine and fir, with large trees and dense cover. Douglas-fir is an important tree species in breeding habitat.	Considered further in this analysis. Suitable habitat for this species is present in the project area. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
*Harlequin duck *Histrionicus histrionicus*	FSC	CSC	NA	This species occurs along large, swift-moving mountain rivers during breeding season. It was formerly found in every major watershed in the Sierra Nevada, but has disappeared, with no sightings for the past 20 years. It has not been observed near Wawona in over 40 years (NPS 1996a).	Considered further in this analysis. This species has been reported historically from the Wawona area. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
*Loggerhead shrike *Lanius ludovicianus*	FSC	—	NA	This species occupies grassland and herbaceous habitats including old-field, savanna, cropland, and desert. It prefers shortgrass pastures or prairies and will use shrubs and small trees for nest sites.	Removed from further analysis. Suitable habitat for this species is absent from the project area. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.
*Lewis' woodpecker *Melanerpes lewis*	FSC	—	NA	This species occupies open forest habitat, mostly ponderosa pine, and post-fire habitat. It may also be found in oak woodlands and in riparian woodland with an open canopy.	Considered further in this analysis. Suitable habitat for this species is present in the project area. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
*Long-billed curlew *Numenius americanus*	FSC	—	NA	This species occupies herbaceous wetland and riparian habitats and upland grasslands. It prefers prairies and grassy meadows, generally near water.	Removed from further analysis. Suitable habitat for this species is absent from the project area. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.
*Rufous hummingbird *Selasphorus rufus*	FSC	—	NA	This species occupies conifer forest and woodland, alpine areas, grasslands, shrublands, and orchards. It is associated with old-growth coniferous forest stands and will breed in second growth stands.	Considered further in this analysis. Suitable habitat for this species is present in the project area. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
*Brewer's sparrow *Spizella breweri*	FSC	—	NA	This species occupies desert, shrubland, and chaparral habitats. It is strongly associated with sagebrush over most of its range.	Removed from further analysis. Suitable habitat for this species is absent in the project area. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.
*California spotted owl *Strix occidentalis occidentalis*	FSC	CSC	NA	Breeds in dense oak and ponderosa pine forests to lower red fir forests. Need canopy closure greater than 70% for roosting and nesting and greater than 40% for foraging. None were detected near Wawona in six complete surveys of the area.	Considered further in this analysis. This species is known from observations within 1.5 miles of Wawona; however, the South Fork Bridge Project area was considered too open for use by the California spotted owl (NPS 1996a). Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.

Table C-1. Federal and State Threatened and Endangered Species and Species of Special Concern

Species[1]	Federal Status	State Status	Yosemite National Park Status[2]	Habitat	Determination
Great gray owl *Strix nebulosa*	—	CE	NA	This species occupies coniferous, hardwood, and mixed forests and woodlands, especially near water. Forages over open areas with scattered trees or near forest margins.	Considered further in this analysis. Suitable habitat for this species is present in the project area. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
*Oak titmouse *Baeolophus inornatus*	FSC	—	NA	This species occupies hardwood and mixed forest stands, woodlands, and chaparral. It prefers oak and pine-oak woodland and arborescent chaparral.	Removed from further analysis. Suitable habitat for this species is absent from the project area. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.
*American dipper *Cinclus mexicanus*	FSC	—	NA	This species occupies montane streams, primarily swift-flowing, less frequently found along mountain ponds and lakes.	Considered further in this analysis. Suitable habitat for this species is present in the project area. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
*White-headed woodpecker *Picoides albolarvatus*	FSC	—	NA	This species occupies coniferous forest and woodland habitats, descending to lower elevations during the winter season. They prefer montane coniferous forest, primarily mature pine and fir.	Considered further in this analysis. Suitable habitat for this species is present in the project area. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
Nuttall's woodpecker *Picoides nuttallii*	FSC	—	NA	This species occupies hardwood forest and woodland habitats and chaparral shrublands. It prefers oak forest and woodland, chaparral and riparian types.	Considered further in this analysis. Suitable habitat for this species is present in the project area. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
Mammals					
*California wolverine *Gulo gulo*	—	CT	NA	This species occupies alpine and arctic tundra and boreal and mountain coniferous forests. Usually it is found in areas with snow on the ground in winter and riparian areas represent important winter habitat. May disperse through atypical habitat. No wolverines have been recorded in California since the 1970s.	Removed from further analysis. Suitable habitat for this species is typically at higher elevations, however the species could be transient through the project area. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.
*Sierra Nevada red fox *Vulpes vulpes necator*	—	CT	NA	The range for this species is poorly documented but includes the Sierra Nevada, typically above 7,000 feet elevation. It occupies various habitats in alpine and subalpine zones the preferred habitat is red fir and lodgepole pine forests and alpine fell-fields. Dens are likely to be in rockslides. There are 5 unconfirmed reports for the Yosemite Valley.	Removed from further analysis. Suitable habitat for this species is absent from the project area. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.

Table C-1. Federal and State Threatened and Endangered Species and Species of Special Concern

Species[1]	Federal Status	State Status	Yosemite National Park Status[2]	Habitat	Determination
Pale Townsend's big-eared bat *Corynorhinus (=Plecotus) townsendii pallescens*	—	CSC	NA	This species is a cave-dweller that occurs in a variety of habitats including the shrub-steppe and forest edge. They roost in caves, mines, on rocky outcrops, and in buildings.	Considered further in this analysis. Suitable habitat for this species may be present in the project area. This species was captured during 1994 near the South Fork Merced River in Wawona. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
Pacific western big-eared bat *Corynorhinus (=Plecotus) townsendii townsendii*	FSC	—	NA	This species is found in all habitats up to the alpine zone. Requires caves, mines, or buildings for roosting. Prefers mesic habitats where it feeds on insects from brush or trees along habitat edges. Captured during 1993 survey in Yosemite Valley.	Considered further in this analysis. Suitable habitat for this species may be present in the project area. This species was captured during 1994 near the South Fork Merced River in Wawona. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
*Spotted bat *Euderma maculatum*	FSC	CSC	NA	This species forages over a variety of habitats and is rare throughout its range. It uses crevices and rock faces for roosting. The species was located near Wawona during 1992-1997.	Considered further in this analysis. Suitable habitat for this species may be present in the project area. Acoustic data from 1994 indicates that a significant population of spotted bats occurs in Wawona. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
*Greater western mastiff-bat *Eumops perotis californicus*	FSC	CSC	NA	This species is found in a variety of habitats to over 10,000 feet in elevation. It roosts primarily in crevices in cliff faces and on trees. It is detected most often over meadows and other open areas, but also forages over tree canopies.	Considered further in this analysis. Suitable habitat for this species may be present in the project area. This species was captured during 1994 in the Wawona area. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
*Sierra Nevada snowshoe hare *Lepus americanus tahoensis*	FSC	—	NA	This species inhabits high elevations, above the mixed conifer zone within the Sierra Nevada.	Removed from further analysis. Suitable habitat for this species is absent from the project area. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.
*American (=Pine) marten *Martes americana*	FSC	—	NA	This species occupies dense deciduous, mixed, or coniferous upland and lowland forest and my use rocky alpine areas. The foraging activity is nocturnal in winter and diurnal in summer in the Sierra Nevada.	Removed from further analysis. Although suitable habitat is present in the vicinity of the project site, it is unknown if the species uses this busy area. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.
*Pacific fisher *Martes pennanti pacifica*	FSC	CSC	NA	This subspecies occurs in coniferous forests and deciduous riparian habitats with high canopy closure, between 4,000 and 6,000 feet in elevation. They have been observed near Crane Flat and Henness Ridge in the last ten years.	Considered further in this analysis. Suitable habitat for this species is present in the vicinity of the project site. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.

Table C-1. Federal and State Threatened and Endangered Species and Species of Special Concern

Species[1]	Federal Status	State Status	Yosemite National Park Status[2]	Habitat	Determination
*Small-footed myotis bat *Myotis ciliolabrum*	FSC	—	NA	This species is usually found below 8,800 feet in elevation and in wooded and brushy habitats near water. It forages among trees and over water. It breeds in caves, mines, and buildings.	Considered further in this analysis. Suitable habitat for this species may be present in the project area. This species was captured using mist-netting techniques during 1994 in the Wawona area. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
*Long-eared myotis bat *Myotis evotis*	FSC	—	NA	This species has a broad range from the coast to high elevations in the Sierra Nevada. It occupies montane oak woodland habitat and roosts in hollow trees. It was captured in Yosemite Valley in 1993.	Considered further in this analysis. Suitable habitat for this species may be present in the project area. This species was captured on the Wawona Golf Course and along the South Fork Merced River using mist-netting techniques during 1994. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
*Fringed myotis bat *Myotis thysanodes*	FSC	—	NA	This species occurs up to 6,400 feet in elevation, in deciduous/mixed conifer forests. It feeds over water, in open habitats, and off foliage. Roosts in caves, mines, buildings, and trees. It has been captured in Yosemite Valley.	Considered further in this analysis. Suitable habitat for this species may be present in the project area. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
*Long-legged myotis bat *Myotis volans*	FSC	—	NA	This species occurs up to high elevations in the Sierra Nevada. It occupies montane coniferous forest habitats and forages over water, close to trees and cliffs, and in forest openings. It was captured in the Yosemite Valley during 1993.	Considered further in this analysis. Suitable habitat for this species may be present in the project area. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
*Yuma myotis bat *Myotis yumanensis*	FSC	CSC	NA	This species usually occurs below 8,000 feet elevation, foraging over open, still, or slow-moving water and above low vegetation in meadows. Roosts in caves, buildings, or in crevices. It was captured near Wawona in 1993 and 1994.	Considered further in this analysis. Suitable habitat for this species may be present in the project area. This species was captured in Wawona and along the South Fork Merced River near Wawona during 1993-1994 mist-netting surveys. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
Mount Lyell shrew *Sorex lyelli*	FSC	—	NA	This species is known from wetland communities, near streams, in grassy areas, under willows, and in sagebrush steppe community at elevations of 6,900-10,350 feet. It is known from areas in and around Yosemite National Park.	Removed from further analysis. Although suitable habitat occurs in the project area, the elevation is nearly 3,000 feet lower. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.
Plants					
Small's southern clarkia *Clarkia australis*	—	—	PR	This species is endemic to California in Mariposa, Madera, and Tuolumne counties. It is an annual plant confined to open ponderosa pine forests, lower montane coniferous forest, and cismontane woodland between 2,400-6,300 feet elevation.	Considered further in this analysis. Suitable habitat for this species may be present in the project area. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.

Table C-1. Federal and State Threatened and Endangered Species and Species of Special Concern

Species[1]	Federal Status	State Status	Yosemite National Park Status[2]	Habitat	Determination
Rawson's flaming-trumpet *Collomia rawsoniana*	FSC	—	UNK	This species is found in California and Oregon, growing on cool, shaded areas near streams from 3,000-6,000 feet elevation.	Considered further in this analysis. Suitable habitat for this species may be present in the project area. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
*Congdon's woolly-sunflower *Eriophyllum congdonii*	FSC	CR	UNK	This species is a California endemic that occupies chaparral, cismontane woodland, and lower montane coniferous forest. It occurs on dry ridges on metamorphic rocks, scree, and talus.	Removed from further analysis. Suitable habitat for this species is absent from the project area. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.
Yosemite lewisia *Lewisia disepala*	FSC	—	PR	This species occupies lower montane coniferous forest, pinyon – juniper woodland, and upper montane coniferous forest, growing on sandy soils derived from granite.	Considered further in this analysis. Suitable habitat for this species may be present in the project area. Refer to Chapter III for background data on this species and Chapter IV for an analysis of direct, indirect, or cumulative effects on this species.
*Short-leaved hulsea (=Shortleaf alpinegold) *Hulsea brevifolia*	FSC	—	PR	This species is occasional in California and has a limited habitat.	Removed from further analysis. Suitable habitat for this species is absent from the project area. There is no expected direct, indirect, or cumulative effect on this species from the Preferred Alternative and this species is not evaluated further.

[1] A '' indicates that the species occurs (has been observed) on the Wawona topographic quadrangle (USFWS 2002).*

[2] This designation applies only to species of plants considered to be rare in Yosemite National Park

FE = Federally-listed as endangered; FT = Federally-listed as threatened; FPT = Federally proposed as threatened; FSC = Federal species of special concern; FD = Federally delisted; CAN = Candidate for federal listing; CE= California endangered; CT = California threatened; CSC = California species of special concern; PR = considered rare in the park; NA = Not Applicable; UNK = Presently Unknown

Appendix D: Cumulative Projects

Introduction

The Council on Environmental Quality's regulations for implementing the National Environmental Policy Act defines cumulative effects as:

> "the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non- federal) or person undertakes such actions" (40 CFR § 1508.7).

Following is a list of projects that may have potential cumulative impact when considered along with the South Fork Merced River Bridge Replacement Project alternatives. The purpose of the cumulative impact analysis is to determine (1) whether the resources, ecosystems and human communities have already been affected by past or present activities, and (2) whether other agencies or the public have plans that may affect resources in the future. The cumulative project list includes major plans and projects involving the South Fork Merced River corridor, and one transportation- related project in Yosemite Valley.

Agency Name: National Park Service

Project Name: **Merced Wild and Scenic River Comprehensive Management Plan**

Description: In 1999 and 2000, the National Park Service developed a comprehensive management plan for the sections of the Merced Wild and Scenic River that it administers. The purpose of the *Merced Wild and Scenic River Comprehensive Management Plan* (Merced River Plan) is to protect and enhance the Outstandingly Remarkable Values and free- flowing condition of the river for the benefit and enjoyment of present and future generations.

The Merced River Plan applies seven management elements to prescribe desired future conditions, typical visitor activities and experiences, and park facilities and management activities allowed in the river corridor. The seven management elements include boundaries, classifications, Outstandingly Remarkable Values, a Wild and Scenic Rivers Act Section 7 determination process, River Protection Overlay, management zoning, and a Visitor Experience and Resource Protection framework. The Merced River Plan applies to any project that is within the Wild and Scenic River boundary, or would affect the Outstandingly Remarkable Values or free- flowing condition of the river.

Agency Name: National Park Service

Project Name: **South Entrance/Mariposa Grove Site Planning**

Description: The National Park Service is considering alternatives for restoring giant sequoia habitat in the Lower Mariposa Grove of Giant Sequoias in Yosemite National Park by relocating the existing parking area to the vicinity of the South Entrance. It is expected that water drainage improvements will be made to the Mariposa Grove Road and that the existing water supply line would then be relocated into the road corridor. At South Entrance, the roadway would have minor realignments and the road would be repaved to address roadway safety problems. (Minor road realignment would require the relocation of the park entrance stations.) The visitor facilities located at the South Entrance area (such as visitor orientation/interpretation and restrooms) would be retained, improved, or added.

Agency: National Park Service

Project Name: **Wilderness Boundary Protection Land Exchange, Seventh Day Adventist Camp, Wawona**

Description: The Seventh Day Adventist recreational camp is located in Wawona on privately owned land inside the boundaries of Yosemite National Park. The privately owned land occupied by the camp nearly abuts portions of Yosemite's designated Wilderness. To protect designated Wilderness, this project would exchange lands between the National Park Service and the Seventh Day Adventist Camp. The proposed land exchange would consist of exchanging approximately 15 acres of land adjacent to the wilderness boundary owned by the Seventh Day Adventists with approximately 18 acres of National Park Service lands located immediately west of the Camp along Forest Road.

Agency: National Park Service

Project Name: **Wawona Campground Improvement**

Description: As specified by the Yosemite National Park 1980 *General Management Plan*, this project would rehabilitate the existing campground and construct an additional campground in Section 35.

Agency Name: U.S. Forest Service and Bureau of Land Management

Project Name: **South Fork and Merced Wild and Scenic River Implementation Plan**

Description: The U.S. Forest Service and the Bureau of Land Management developed a joint South Fork and Merced Wild and Scenic River Implementation Plan in 1991 for the segments of the main stem and South Fork of the Merced River that are under the jurisdiction of these agencies. The segments include a 15- mile section of the main stem extending from the El Portal Administrative Site to a point 300 feet upstream of the confluence with Bear Creek, a 21- mile segment of the South Fork from the park boundary to the confluence of the Merced River, and a 3- mile segment of the South Fork just upstream of Wawona, where the National Park Service has jurisdiction over the north side of the river and the U.S. Forest Service has jurisdiction over the south side. The plan calls for the long- term protection of natural and cultural resources, and managing the area for the use and enjoyment of visitors in a way that will leave the resource unimpaired for future use and enjoyment as a natural setting.

Agency Name: National Park Service

Project Name: **Yosemite Valley Plan**

Description: The *Yosemite Valley Plan* provides modification and implementation of the *General Management Plan* of 1980 based on information collected and analyses conducted since 1980. The *Yosemite Valley Plan* is designed to restore, protect, and enhance the resources of Yosemite Valley; provide opportunities for high- quality, resources- based visitor experiences; reduce traffic congestion; and provide effective park operations, including employee housing, to meet the mission of the National Park Service.

Elements of the plan include restoration of 176 developed and disturbed acres of land in Yosemite Valley; redevelopment of 173 acres of developed land; development of 73 acres of undeveloped land; and various changes in park facilities, including consolidation of parking, additional campsites, reduction in lodging units, reduction in traffic, road closures and rerouting, and land restoration. The net effect of which will be to reduce development in Yosemite Valley by 71 acres.

Specifically, the plan calls for relocating 174 apartment, studio, or dormitory bed spaces from Yosemite Valley to Wawona, for those employees who work in Yosemite Valley. Additionally, 24 apartment, studio, or dormitory bed spaces would be provided to meet current housing shortages for employees who work in Wawona.

Trips into the east end of Yosemite Valley would be reduced for visitors in private vehicles; these trips would be replaced by a much smaller number of bus trips. This would be accomplished through limiting day- visitor parking in the valley and providing day- visitor parking outside Yosemite Valley. Although nothing specific is planned in Wawona, this could cause more people to visit the area and use the South Fork Bridge if they were unable to access Yosemite Valley.

Agency: Mariposa County

Project Name: **Mariposa County General Plan Update**

Description: The *Mariposa County General Plan* update process is ongoing. As of February 2003, a draft updated document was available for public comment. The plan provides general guidance for land use, zoning, and development throughout Mariposa County.

Agency: California State Department of Transportation; U.S. Department of Transportation, Mariposa County; Merced County Association of Governments; Mono County; National Park Service – Yosemite National Park; U.S. Forest Service – Sierra National and Inyo National Forest.

Project Name: **Yosemite Area Regional Transportation System (YARTS)**

Description: YARTS is a collaborative, inter- agency effort begun in 1992 to evaluate the feasibility of a regional transportation system and to identify the best options for initial implementation and upkeep of such a system. YARTS is a Joint Powers Authority under California law, and the National Park Service is an ex- officio partner of the Joint Powers Authority Commission, participating in all discussions, but not voting as a member. The YARTS mission statement is as follows:

> *YARTS will provide a positive alternative choice for access to Yosemite National Park for visitors, employees, and residents. YARTS service is not intended to replace auto- access or trans- Sierra travel, but is intended to provide a viable alternative that offers a positive experience, maximizing comfort and convenience for riders while guaranteeing access into the park.*

YARTS has four primary objectives:

- Increase transportation options
- Reduce reliance on automobiles
- Support local economies
- Improve regional air quality

A two- year demonstration service tested the YARTS concept from May 2000 to May 2002, with most service offered in the summer months.

Appendix E: Draft Wetland Statement of Findings

This Wetland Statement of Findings is included in this document for public review to meet the obligations of Executive Order 11990 (*Protection of Wetlands*) and NPS Procedural Manual 77- 1: *Wetland Protection*.

Purpose of this Statement of Findings

The purpose of this Wetland Statement of Findings is to review the South Fork Merced River Bridge Replacement Project in sufficient detail to:

- Avoid, to the extent possible, the short- and long- term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative.
- Describe the effects on wetland values associated with the Preferred Alternative.
- Provide a thorough description and evaluation of mitigation measures developed to achieve compliance with Executive Order 11990 (*Protection of Wetlands*) and National Park Service Procedural Manual 77- 1: Wetland Protection.
- Ensure no net loss of wetland functions or values.

Affected Wetlands

Wetlands Extent

Wetlands[1] and riverine habitats are present in the channels of the South Fork Merced River and Angel Creek within the project area. In addition, narrow bands of mixed palustrine forest occupy the river- right and river- left banks. A total of less than 0.5 acre of wetlands exist within the project area with most of the wetlands area classified as aquatic habitat (approximately 85%) and the remainder classified as mixed palustrine forest (approximately 5%), and sparse shrub- scrub wetlands (approximately 9%).

Wetland Characteristics

Specific wetland classes identified within the project area are limited to riverine (river and creek) and palustrine (cobble bar). Using the Cowardin (USFWS 1979) classification, specific wetland and riparian classes within the project area include:

- Riverine upper perennial – main channel of the South Fork Merced River
- Palustrine forest – riparian forest habitat along the South Fork Merced River subject to various flooding regimes
- Palustrine scrub- shrub – riparian scrub (e.g., willow) habitat on cobble bars within the South Fork Merced River subject to various flooding regimes
- Palustrine emergent – herbaceous (e.g., sedge, rush, grass, etc.) habitat within Angel Creek subject to various runoff and flooding regimes.

The size, connectivity, and integrity of wetlands in the project area, particularly palustrine scrub-shrub, palustrine forest, and riverine habitat, have been directly compromised by the bridge and Wawona Road, which constrict the floodplain of the South Fork Merced River in the immediate area of the bridge and alter hydrologic flows. The majority of wetland acreage in the project area

[1] *Wetlands herein are described using the Cowardin classification system.*

is classified as riverine upper perennial and includes the open and flowing water of the South Fork Merced River. Riverside vegetation overhanging the main channel is mostly absent and contributes only minimal nutrients, organic matter, or shade to the riverine system. Redirected flows around bridge piers and abutments, coupled with the narrow band of riparian vegetation, have resulted in some bank erosion downstream of the structure on the river- right bank. Immediately upstream of the South Fork Bridge, a temporary Bailey bridge has been installed to carry Wawona Road traffic, and this structure serves as the limit for construction activities.

The floodplain in the vicinity of the bridge is restricted between approximately 25- foot high embankments. The river- left side, upstream of the bridge, has been confined by a vertical stone wall attached to the abutment on that side. Below the bridge, on the river- left side, there is a narrow band of white alder and incense- cedar trees and the mouth of Angel Creek (approximately 50- feet below the structure). The river- right side, both up- and downstream of the bridge, supports a narrow band of ponderosa pine, incense- cedar, white alder, California coffee- berry, horsetail, and bedstraw, primarily. Cobble bars within the river support a sparse stand of sandbar willow, horsetail, and sedge adjacent to the low- flow channel. Angel Creek supports a dense stand of horsetail, sedge, rush, thistle, small willow shrubs, blackberry, and cut-leaved blackberry. This small creek lies outside the zone of construction activities.

The South Fork Merced River downstream of the bridge is relatively level with a narrow band of riparian and scrub- shrub wetland vegetation along the river course. Riparian species in this area are characterized by small stands of willow, white alder, black oak, and ponderosa pine.

Existing Structures in Wetlands

Two South Fork Bridge piers and the bridge abutments are located within the bed and banks of the South Fork Merced River. The piers are located mid- channel and the river- right and river-left abutments are located within the riverbanks and palustrine forest zone.

Environmental Consequences of the Proposed Action on Wetlands

Analysis

Removal and construction of a new South Fork Merced River Bridge would have local, short-term, adverse, demolition/construction- related effects, including cofferdam placement, to the riverine habitat in a 90- foot- wide work zone. Within this work zone, sparse scrub- shrub wetland has become established along the low- flow channel. Effects to wetland and aquatic habitats would result from heavy equipment used for demolition/construction activities, causing soil disturbance and compaction, generating dust, vegetation removal, root damage to adjacent vegetation, erosion, and potential introduction of and spread of non- native species. The application of mitigation measures described below (e.g., Best Management Practices) would reduce the potential adverse impacts to wetland and aquatic habitats to a negligible intensity. Refer to *South Fork Merced River Bridge Replacement Environmental Assessment*, Chapter II, Alternatives, for mitigation measures incorporated into the proposed action.

In the long term, removal of the existing South Fork Bridge piers would restore the free- flowing condition of the South Fork Merced River, returning this portion of the river to a more natural state, thereby enhancing the hydrologic and biologic integrity of associated wetlands. The area would support riffle and shallow pool aquatic habitat, because deep scour holes that have formed around the piers would fill with cobble and sediment. This would result in habitat for fish and wildlife found in free- flowing rivers, including the Wawona riffle beetle, a species of special concern that inhabits these waters. There would be a small net gain in the area of floodplain, with a corresponding increase in the area of wetland vegetation (scrub- shrub and palustrine forest).

Cumulative Impacts

Cumulative effects to wetland and aquatic resources discussed herein are based on analysis of past, present, and reasonably foreseeable future actions in the South Fork Merced River corridor, in combination with potential effects of this alternative. The projects identified below include those projects that have the potential to affect local wetland patterns (i.e., within the river corridor) as well as regional wetland patterns related to the South Fork Merced River.

Wetland and riparian systems of the South Fork Merced River corridor have been altered somewhat by development and visitor activities. The largest of these alterations in the project vicinity was associated with development of the Wawona Golf Course early in the 20th century. In order to provide habitat for turf grasses and a playable surface, the wetlands associated with this site were drained and likely filled. These changes have had negative effects to the size, form, and function of wetland, aquatic, and riparian habitats and related species. While some of the past, present, and future projects in the South Fork Merced River corridor could have short-term, construction- related impacts on wetland resources, overall the cumulative projects would increase the size, connectivity, and integrity of wetland resources within the corridor, resulting in a long- term, minor, beneficial, cumulative effect on wetland patterns of the South Fork Merced River due to resource preservation and management focus.

Reasonably foreseeable future actions within the South Fork Merced River corridor are considered to have an overall beneficial effect on wetlands. For example, the Merced River Plan protects river- related natural resources through the application of management elements, including the River Protection Overlay, management zoning, protection and enhancement of Outstandingly Remarkable Values, and implementation of a Visitor Experience and Resource Protection framework. The *South Fork and Merced Wild and Scenic River Comprehensive Implementation Plan* provides river- related resource protection and management along the common National Park Service/U.S. Forest Service boundary of the South Fork Merced River that occurs approximately three miles upstream of the South Fork Bridge. Obtaining land currently being used as the Seventh Day Adventist Camp near Wawona, along with redesign and construction of the existing and new Wawona Campground facilities downstream of the bridge, would further provide for resource preservation, protection, and management activities in the South Fork Merced River drainage in the project vicinity.

Conclusions

Removal and replacement of the South Fork Bridge, particularly the piers and abutments, and removal of the temporary Bailey bridge would restore the free- flowing condition of the South Fork Merced River and return this portion of the river to a more natural state, thereby enhancing its biological integrity. The proposed action would result in a site- specific, long- term, negligible to minor, beneficial effect on vegetation, including aquatic, wetland, riparian, and upland types that provide habitat for a diversity of river- related species. The extent and quality of vegetation, including aquatic, wetland, riparian, and upland types, and other riverine habitats throughout the remainder of the South Fork Merced River corridor would be unaffected. Past, present, and reasonably foreseeable future projects, in combination with the proposed action, would have a net long- term, minor, beneficial effect on wetland patterns within the South Fork Merced River corridor.

Alternatives Considered

Alternatives considered in the *South Fork Merced River Bridge Replacement Environmental Assessment* (Chapter II, Alternatives) include the No Action Alternative and South Fork Merced River Bridge Replacement.

Alternative 1: No Action

Alternative 1, the No Action Alternative, would allow the South Fork Bridge to remain in its present condition, without replacement, maintenance, or repair. The temporary Bailey bridge would continue to serve as vehicle access into the park. No management action would be taken to repair, remove, or replace the bridge. The condition of benign neglect would eventually result in the collapse of a portion of the bridge, causing release of bridge debris into and possible bank erosion of the South Fork Merced River. Further natural resource damage would result from raw sewage entering the river (i.e., from broken sewerline that is attached to the existing bridge) and impacts resulting from removing debris from the downriver reach following a collapse.

Alternative 2: South Fork Merced River Bridge Replacement (Preferred Alternative)

Alternative 2 includes removal of the existing triple- span South Fork Bridge and replacement with a new single- span bridge in the same location. The new bridge would be approximately 150- feet long and 42- feet wide and would be approximately 13- feet wider to accommodate wider travel lanes, shoulders, and a new 5- foot- wide sidewalk. The new bridge would span the entire South Fork Merced River without the need for center support piers, thus restoring a more natural flow through this river reach. Utility lines attached to the existing bridge would be transferred to the temporary Bailey bridge during demolition and removal of the existing bridge and construction of the new bridge. When traffic and utility lines are rerouted onto the new bridge structure, the temporary Bailey bridge would be removed, along with the approaches and temporary abutments, and the site restored. The contractor staging area would be in the Wawona District Material Storage Area, approximately 0.4- mile east of the bridge. Construction of this project is expected to last approximately one year, starting about September 2003, with completion anticipated by October 2004.

Design or Modifications to Minimize Harm to Wetlands

Best Management Practices and Resource-Specific Mitigation Measures

Best management practices and resource- specific mitigation measures would be implemented, as appropriate, prior to, during, and/or after construction and removal of the temporary Bailey bridge.

Best Management Practices During Bridge Removal

The National Park Service (and its contractors) shall implement the following Best Management Practices, as appropriate, prior to, during, and/or after bridge removal. Specific tasks would include, but are not limited to, the following:

- Inspect the project to ensure that impacts stay within the parameters of the project and do not escalate beyond the scope of the environmental assessment, and to ensure that the project conforms to the U.S. Army Corps of Engineers Section 404 permit, Central Valley Regional Water Quality Control Board Waiver of Waste Discharge Requirements and 401 Water Quality Certification, and other applicable permits or project conditions.

- The National Park Service project manager shall ensure that the project remains confined within the parameters established in the *South Fork Merced River Bridge Replacement Environmental Assessment*, U.S. Army Corps of Engineers Section 404 permit, etc. The National Park Service project manager shall ensure that mitigation measures are properly implemented.

- Small, wheeled or tracked equipment shall be allowed to enter the river to assist in the placement of a containment system and a structural support system or to remove demolition debris from the river. To protect the riverbank, this equipment shall be lifted from the riverbank by crane and placed on the riverbed, or shall be driven on a ramp into the riverbed. Heavy equipment used within the bed and banks of the South Fork Merced River should be placed on mats, or other measures would be taken to minimize disturbance.

- The load limit and equipment size shall be restricted to protect nearby utility lines and established native vegetation.

- All construction equipment shall be stored within the delineated work limits and/or at the Wawona District Materials Storage Area.

- Implement measures to reduce effects of demolition and construction on visitor safety and experience. Visitors, contractors, and park personnel shall be safeguarded from demolition and construction activities. A barrier plan indicating locations and types of barricades shall be used to protect public health and safety.

- An emergency notification program shall be in place. Standard measures for emergency notification include:

  - Notification of utilities and emergency response units prior to demolition and construction activities, which require translocating utilities to the temporary Bailey bridge
  - Identify locations of existing utilities prior to activity to prevent damage to utilities during translocation activities
  - Contact Underground Services Alert 72 hours prior to any ground disturbance
  - No demolition or construction activity shall be allowed until the process of locating and translocating existing utilities is complete

- All tools, equipment, barricades, signs, surplus materials, and rubbish shall be removed from the project work limits upon project completion. Any asphalt surfaces damaged due to work on the project shall be repaired to original condition. All demolition debris shall be removed from the project site, including all visible concrete and metal pieces.

- Disturbed areas shall be graded and raked smooth to eliminate tire tracks and tripping hazards.

Resource-Specific Measures

Site Restoration

The last phase of the project is site restoration. Following removal of the existing bridge, construction of the new bridge, and removal of the temporary Bailey bridge, the site will be graded and recontoured, as necessary, to revegetate with appropriate wetland, riparian, and upland plant species. Ground surface treatment will include grading to natural contours, topsoiling, seeding, and planting. Accepted erosion protection measures, including jute mesh and hydro mulch, may be used, if necessary, to prevent soil loss. The National Park Service will

prepare a prescription for revegetating any disturbed areas, including riverbanks, to be included in the construction specifications. This prescription will comply with the Yosemite *Vegetation Management Plan* (NPS 1997a). Revegetation of disturbed sites will be conducted by park staff immediately following construction to reduce the potential for non- native plant invasion. All plant materials will be from genetic stock indigenous to Wawona, including trees, shrubs, and forbs obtained from the construction site by salvage methods or by propagating container plants from seed or cuttings. Following restoration efforts, the reclaimed sites will be monitored to determine if reclamation efforts are successful or if additional remedial actions are necessary. Remedial actions could include installation of erosion control structures, reseeding, and/or replanting the area, and controlling non- native plant species.

Proposed Compensation

No offsite compensation is required. The proposed action is designed to restore natural fluvial processes and wetland characteristics in the South Fork Merced River. The proposed action would result in a net increase of wetland extent, function, and value in the vicinity of the bridge. Free flow and natural movement of woody debris would be restored.

Justification

Nonwetland Alternatives to the Proposed Action

The South Fork Bridge is located within the bed and banks of the South Fork Merced River, within riverine and palustrine forest habitats of the river. The purpose of the South Fork Merced River Bridge Replacement Project is to replace the condemned and closed bridge, replace it with a new single- span structure, and remove the temporary Bailey bridge. This action complies with the spirit of the Wild and Scenic Rivers Act and the intent of the Merced River Plan—to protect and enhance Outstandingly Remarkable Values and restore free- flowing conditions to the South Fork Merced River. There are no alternatives to the proposed action that could be located outside the floodplain or wetland and aquatic habitat of the South Fork Merced River.

New Development

No new development is proposed for the South Fork Merced River Bridge Replacement Project. No new facilities would be located within wetland or riverine habitats.

Existing Development

The proposed action includes complete removal and replacement of the bridge and removal of the temporary Bailey bridge. Restoration, including revegetation of disturbed ground surfaces, would occur upon project completion.

Redevelopment

A single- span bridge would be constructed across the South Fork Merced River in place of the existing structure.

Conclusion

The proposed action would replace the condemned and closed South Fork Bridge and the potentially hazardous conditions associated with flooding by removing piers and abutments from the bed and banks of the South Fork Merced River. Following the new bridge construction, the temporary Bailey bridge would be removed and the site restored.

The proposed action would have a beneficial impact on the extent, function, and value of wetlands by enhancing free- flowing conditions of and woody debris transport in the South Fork

Merced River at this location. The National Park Service has determined that there is no practicable alternative that could be located outside the floodplain or wetland habitat. Mitigation and compliance with regulations and policies to prevent impacts to water quality, wetland function and values, and loss of property or human life would be strictly adhered to during and after bridge replacement.

Individual permits and other federal and cooperating state and local agencies will be obtained or updated, as appropriate, prior to removal activities. No long- term adverse impacts to wetlands would occur from the proposed action. Therefore, the National Park Service finds the proposed action to be acceptable under Executive Order 11990 for the protection of wetlands.

Recommended:

Superintendent, Yosemite National Park Date

Certification of Technical Adequacy and Servicewide Consistency:

Chief Water Resources Division Date

Approved:

Regional Director Pacific West Region, National Park Service Date

Appendix F: Draft Floodplain Statement of Findings

DRAFT STATEMENT OF FLOODPLAIN FINDINGS FOR SOUTH FORK MERCED RIVER BRIDGE REPLACEMENT PROJECT

Yosemite National Park
Yosemite, California
U.S. Department of the Interior
National Park Service

INTRODUCTION

Description of the Proposed Action:

This project involves removing the existing bridge that carries traffic on Wawona Road (Highway 41) across the South Fork of the Merced Wild and Scenic River (South Fork Merced River). In order to cross the river, all vehicle traffic must use this bridge, which conveys nearly one- third of Yosemite's annual visitors. The bridge would be replaced with a single- span structure, and a temporary Bailey bridge (constructed when the existing bridge on the South Fork Merced River was condemned and closed in 1998), currently carrying traffic across the river, would be removed. This project has several purposes, including:

- To protect visitor health and safety by eliminating and replacing the condemned and closed bridge with a wider, safer structure; by opening the permanent roadway; and by removing the concrete barriers.
- To remove the temporary bridge, which has served beyond its original intent and has created a visual intrusion on an otherwise popular scenic location.
- To protect park infrastructure from bridge collapse, specifically the reclaimed waterline, sewerline, high- voltage electrical line conduit, and telecommunications lines that are attached to the bridge.
- To prevent the difficult and potentially dangerous removal of bridge debris from the river that would result if the bridge collapsed.
- To protect park resources from localized flooding that could result from uncontrolled bridge collapse and resultant damming during a high- flow period.
- To protect and enhance the Merced Wild and Scenic River Outstandingly Remarkable Values by removing impediments to the free- flowing condition of the river, i.e., replacing two in- river piers and abutments with a new single- span bridge (there will be no in- river piers).

Two alternatives are analyzed in the environmental assessment prepared for the South Fork Merced River Bridge Replacement Project. Alternative 1 (No Action) describes the impacts that would result if the existing bridge were not replaced, and the temporary Bailey bridge remained in place. Alternative 2 (Preferred Alternative) would entirely remove the existing bridge, replace it with a single- span bridge, and would remove the temporary Bailey bridge and access. The proposed bridge would be 13- feet wider than the old bridge and would span the entire South Fork Merced River without the need for center support piers, thus restoring a more natural flow through this river reach. During construction of the new bridge, traffic would continue to be

routed over the temporary Bailey bridge so there would be minimal impact on current traffic flows. Upon completion of the new bridge, the existing asphalt roadway would be pulverized in place and used as a base for new pavement. The temporary Bailey bridge and the transitional road segments would be removed, and the area surrounding the temporary bridge site would be restored.

Site Description

The site for the proposed project encompasses approximately 0.22 mile of South Fork Merced River floodplain in Wawona. Wawona consists of National Park Service and privately owned land; most of the private land lies within Section 35 of the U.S. Geological Survey topographic quadrangle map covering this area. Utility lines are currently attached to the South Fork Bridge and provide water, sewage, electricity, and communications services for the Wawona Golf Course, Wawona Hotel, and the wastewater treatment facility pump station.

The South Fork Merced River originates at an elevation of 10,500 feet at the drainage divide with the Merced Peak Fork, flows westward, and joins the Merced River 43 miles from its headwaters, west of El Portal, on land administered by the U.S. Forest Service. Headwaters for the South Fork Merced River are in the vicinity of Triple Divide Peak, where flows are westerly over granitic bedrock to Wawona. Site elevations range from approximately 4,020 feet in the river bottom, approximately 4,033 feet at the northern project terminus, and approximately 4,047 feet at the southern project terminus. The riverbanks, which consist predominantly of constructed rock walls with some riprap, are approximately 25- feet high, vertical on the southern bank, and steeply sloped on the northern bank.

The average annual discharge of the South Fork Merced River is approximately 250,000- acre feet of water. The river drains approximately 76,000 acres within the park boundary and approximately 63,000 acres of watershed drains through Wawona. The average mean stream flow at the South Fork Bridge site is approximately 174- cfs. The historic average annual flow of the South Fork Merced River, at its confluence with the Merced River, is 356- cfs; the minimum recorded flow was 2.2- cfs, while the maximum recorded flow was 46,500- cfs.

Upstream from the bridge site, tributaries to the South Fork Merced River enter a steep- walled canyon or glacial gorge, emerging into the large floodplain meadow or deep alluvial valley of the Wawona area. Alluvial processes were altered historically due to development related to bridge placement and road construction along streambanks. The South Fork Merced River floodplain within the project site may also be affected by water diversion conducted under the Wawona Water Conservation Plan, which includes provisions for reduction and/or cessation of withdrawals when streamflow drops to critical levels.

The vegetation of the site consists of riparian plant communities, wetlands, and upland plant communities. Narrow bands of mixed palustrine forest and lower montane tree species occupy the riverbanks adjacent to the bridge abutments. These stands consist of ponderosa pine, white alder, and incense- cedar in the overstory; Douglas- fir and California black oak trees are also present on the north riverbank east of the temporary bridge. California black oak may have been the dominant floodplain tree of the South Fork Merced River historically; however, fire suppression has resulted in present- day ponderosa pine dominance and incense- cedar understory dominance. Wetland vegetation of the project site includes sandbar willow, sedges, horsetail or scouring- rush, rushes, thistles, and blackberry. Upland plant communities are relatively sparse in the South Fork Bridge site, and have been historically disturbed. Ponderosa pine is the dominant tree species in these communities, and common herbaceous species observed included the forbs aster, sagewort, peppergrass, rockcress, sheep sorrel, and mullein, and the grasses blue wildrye, foxtail barley, and brome. Several of the herbaceous species are non- native or have been introduced into the Yosemite National Park environs and persist on disturbed roadside soils.

Six major soil types have been identified for the Wawona area. These soil types consist primarily of residual soils on slopes and alluvial soils on the valley floor including stony loamy sand, silt loam, sandy loam, and coarse sandy loam. These soils are moderately to strongly acidic and depths vary from 2 to 4 feet in thickness. These soils are subject to erosion and alluvial processes, including the development of meandering streambeds, floodplains, and wetlands.

General Characterization of the Nature of Flooding in the Area

The Merced River watershed has had 11 winter floods since 1916 that have caused substantial damage to property. All of these floods took place between November 1 and January 31. The largest floods occurred in 1937, 1950, 1955, and 1997, and had discharge rates in the range of 22,000 to 25,000- cfs, as measured at the Pohono Bridge gauging station in Yosemite Valley. These floods were caused by warm winter rains falling on snow at elevations up to 8,600 feet (e.g., Tuolumne Meadows), partially melting the accumulated snow pack. The U.S. Army Corps of Engineers mapped the 100- year floodplain for Wawona in 198,1 and the South Fork Bridge was within this area. It was also determined that the river channel can shift laterally during large floods in Wawona, which is characterized by an elongated alluvial valley. However, the drainage at the bridge site is relatively narrow and has entrenched approximately 20 to 25 feet.

Human- made structures such as bridges and buildings placed within a floodplain can impede natural flow. During floods, portions of the river that would normally flow into floodplain areas are forced under these structures, increasing the amount of channel discharge. The effect of these seemingly minor, flow- related changes can have effects, both upstream and downstream of the bridge on the South Fork Merced River. The higher discharge and reduced flow area cause a backwater effect (a deep, slow- velocity) to form upstream and high velocities to occur near and under the bridge opening. At times, large woody debris becomes lodged against the bridge piers, creating a damming effect.

JUSTIFICATION FOR USE OF THE FLOODPLAIN

Why the Proposed Action Must be Located in Floodplain

As discussed previously, this project is aimed at eliminating a health and safety risk associated with the bridge that provides passage over the South Fork Merced River. Because Wawona Road and the South Entrance of Yosemite National Park is the primary route of access for one- third of park visitors, it is imperative that the bridge over the South Fork Merced River is safe, operational, and in character with the surrounding area, including Wawona. There is an obvious need to construct such a bridge through the floodplain of the river.

Investigation of Alternative Sites

The possibility of building a bridge across the South Fork Merced River in a site outside of a floodplain does not exist, and therefore, no other alternative sites were considered.

DESCRIPTION OF SITE-SPECIFIC FLOOD RISK

Recurrence Interval of Flooding at the Site

Damage has occurred to the South Fork Bridge during flood events in 1937 and 1997. Both floods caused structural damage to the bridge, as well as substantial damage to park facilities and properties within the floodplain, including roads, picnic areas, offices, and lodging units. The 1997 flood, estimated to have a recurrence interval of 90 years, also altered natural features, causing downed trees, movement of landslide talus into streams, channel erosion, and significant changes in channel morphology.

Hydraulics of Flooding at the Site

The 100- year flood flow volume at the South Fork Bridge has been estimated at 13,563- cfs. However, it is believed that flood- stage discharge in this reach of the river could reach approximately 25,000- cfs.

Time Required for Flooding to Occur

The time required for flooding to occur is not currently known, but is expected to be relatively sudden.

Opportunity for Evacuation of the Site in the Event of Flooding

The opportunity to evacuate the South Fork Bride site is good, because it is relatively open and Wawona Road is available for escape from the area.

Geomorphic Considerations

Erosion of the riverbank has been affected by extensive and concentrated visitor use in popular areas of park rivers, introducing sediments into the river. The South Fork Merced River also carries sediments from the mountains which are deposited as alluvium farther downstream. As discussed previously, the bridge on the river constricts flood flows, causing backwater effects and increased velocities, altering the channel of the South Fork Merced River. The river channel in the Wawona area may also shift laterally in response to flood events, but this would be more likely downstream from the bridge site.

DESCRIPTION OF HOW THE ACTION WILL BE DESIGNED OR MODIFIED TO MINIMIZE HARM TO FLOODPLAIN VALUES OR RISK TO LIFE OR PROPERTY

The new bridge across the South Fork Merced River has been designed to span the entire river, eliminating the need for center support piers. This would restore a more natural flow in this reach of the river, which is anticipated to have a long- term, beneficial effect on the floodplain values near Wawona. Removal of the in- stream piers would reduce the backwater effects and high velocities that occur as a result of constricting flood flows. This would help to reduce erosion associated with these events, as well as the potential for catastrophic failure of the bridge. Eliminating the potential for catastrophic bridge failure would reduce the risks to life, property, and natural resources (e.g., soils and riparian vegetation) associated with flooding in this reach of the South Fork Merced River. The rock walls and riprap lining the riverbanks near the South Fork Bridge would continue to be maintained to reduce risks to life or property in this vicinity. Yosemite National Park would obtain all necessary permits prior to proceeding with such work, except in an emergency situation where the impacts would be documented shortly after the fact. The construction of the new bridge would not change the need to maintain this channel, and this would not result in any change in impacts when compared to the No Action Alternative. The bridge structure has also been designed to be consistent with the intent of the standards and criteria of the National Flood Insurance Program (44 CFR Part 60).

SUMMARY

Yosemite National Park proposes to remove the existing bridge that carries traffic on Wawona Road (Highway 41) across the South Fork Merced Wild and Scenic River. The bridge would be replaced with a single- span structure, and a temporary Bailey bridge (constructed when the existing bridge on the South Fork Merced River was condemned and closed in 1998), currently carrying traffic across the river, would be removed. Because Wawona Road and the South Entrance of Yosemite National Park represents the primary route of access for one- third of park

visitors, it is imperative that the bridge over the South Fork Merced River is safe, operational, and in character with the surrounding area, including Wawona. There is an obvious need to construct this bridge through the floodplain of the river. The possibility of building a bridge across the South Fork Merced River in a site outside of a floodplain does not exist, and therefore, no other alternative sites were considered.

A 1997 flood, estimated to have a recurrence interval of 90 years, caused damage to park property and natural features in the Merced River watershed, including the South Fork Merced River, and the South Fork Bridge. The 100- year flood flow volume at the South Fork Bridge has been estimated at 13,563- cfs. However, it is believed that flood- stage discharge in this reach of the river could reach approximately 25,000- cfs.

The new bridge across the South Fork Merced River has been designed to span the entire river, eliminating the need for center support piers. The lack of piers instream would restore a more natural flow in this reach of the river, having a long- term, beneficial effect on floodplain values near Wawona. Implementing the Preferred Alternative would reduce the potential for catastrophic bridge failure, thereby reducing the risks to life, property, and natural resources associated with flooding in this reach of the South Fork Merced River. Construction of the new bridge would not change the need to maintain rock walls and riprap lining the banks of the South Fork Merced River near the bridge, and this would not result in any change in impacts when compared to the No Action Alternative.